Palsonic

PAL/SECAM
DUAL AUTO COLOR TV
REMOCON SYSTEM
SERVICE MANUAL
CHASSIS NO
PS-72
MODEL NO
CX-507Z

NOTE.
THIS SERVICE MANUAL WAS MADE FOR PAL/SECAM REMOCON MODEL, BUT CAN COVER MODEL NUMBER OF 482,343, 344,14CT3 AND 14CT4.

SPECIFICATIONS

Television system	PAL/SECAM-B G SYSTEM	
Channel coverage	VHF channels 2-12	
	UHF channels 21-69	
	(1 total of up to 14 preselected channels)	
Intermediate Frequencies	Picture I-F carrier frequency	38.9 MHz
	Sound I-F carrier frequency	33.4 MHz
	Colour sub-carrier frequency	4.47 MHz
Picture tube	510 UXB22	
	20" diagonal measured, Quick-start, [illegible] tripe 90 degree deflection	
Antenna	VHF/UHF Telescopic dipole antenna (75 ohm u[illegible]ed type)	
Speaker	10 cm (4 inches) dia. 8 ohm 2W	
Power requirements	110/220/240 volts, 50/60 Hz	
Power consumption	85 W	
Dimensions	723(W) x 576(H) x 545(D) mm	
Weight	Net 26.5 Kg	
Accessories supplied	Remocon Transmitter	
REMOCON TRANSMITTER		
Remote control system	Infra-red ray control	
Power requirements	DC 9V x 1	
Dimensions	50(W) x 39(H) x 210(D) mm	
Weight	180 gr	
Accessories supplied	Channel number segments	

Design and specifications are subject to change without notice.

SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION," "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" DESCRIBED BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 25.5kV at zero beam current (minimum brightness) under a 220V, AC power source. The high voltage must not, under any circumstances, exceed 27.5kV. Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure on page 22 of this manual. It is recommended the reading of the high voltage should be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. This receiver is equipped with a Fail Safe (FS) circuit which prevents the receiver from producing an excessively high voltage even if the B+ voltage and Horiz. Output pulse increases abnormally. Each time the receiver is serviced, the FS circuit must be checked to determine that the circuit is properly functioning, following the FS circuit check procedure on page 22 of this manual.
3. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
4. Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

SAFETY PRECAUTION

1. Potentials as high as 24,000 volts are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back cover removed involves a shock hazard from the receiver.
   1) Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.
   2) Always discharge the picture tube anode to the receiver chassis to keep off the shock hazard before removing the anode cap.
   3) Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis parts list.
3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering.
4. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
5. Keep wires away from high voltage or high temperature components.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by shading on the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION.

TABLE OF CONTENTS

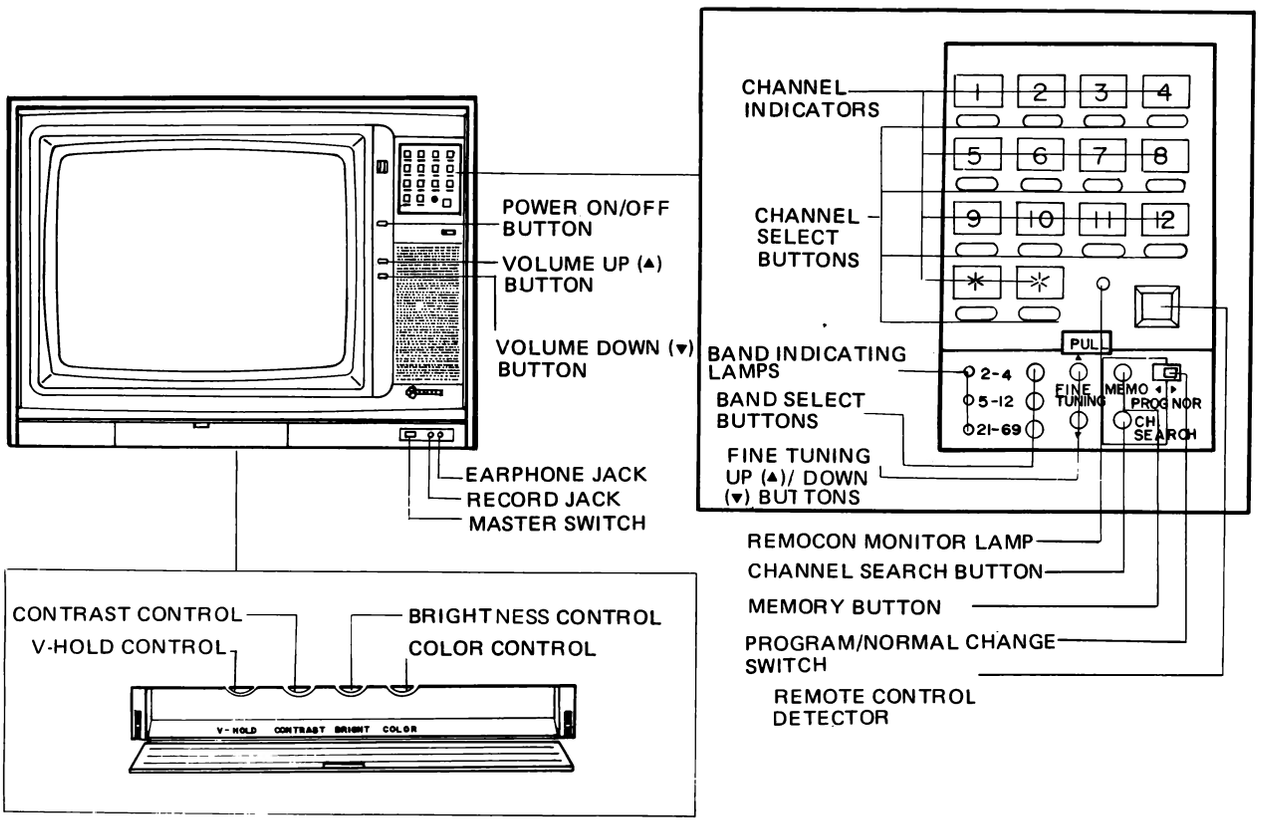
1. SUMMARY

The new colour television model is of all Solid-State table type, primarily of 12 IC's, 81 transistors, 72 diodes and a picture tube of 48.0 cm in-line gun slotted mask type.
A plug-in system is adopted for connecting Main PC (Printed Circuit) Board with a chroma PC module. This will allow easy replacement of module which facilitate rapid and correct inspection and remedy in trouble shooting.
The In-Line Gun Picture Tube has simplified the dynamic convergence adjustment. That is, although a conventional Delta-Gun System requires twelve-position adjustments, the In-Line Gun System requires only two-position adjustments. This implies that an advanced accuracy of convergence is allowed by the In-Line Gun System.
The Model CX-507ZB and CX-507Z are designed at remote control color televisions. With the Remocon Transmitter TM-095 (supplied), you can turn your TV on or off, adjust the sound volume and select previously preset channels anywhere up to 7 meters (23 feet) away from the TV.
The semi-automatic program search system permits easy preset tuning of up to 14 channels VHF, UHF or inactive channels (for monitoring the playback of a video tape recorder).
Your Color TV features the QUICK-START system which provides a picture only a few seconds after the set is switched on. Unlike conventional instant-picture systems, there is absolutely no power consumption for this feature when the set is not in use.

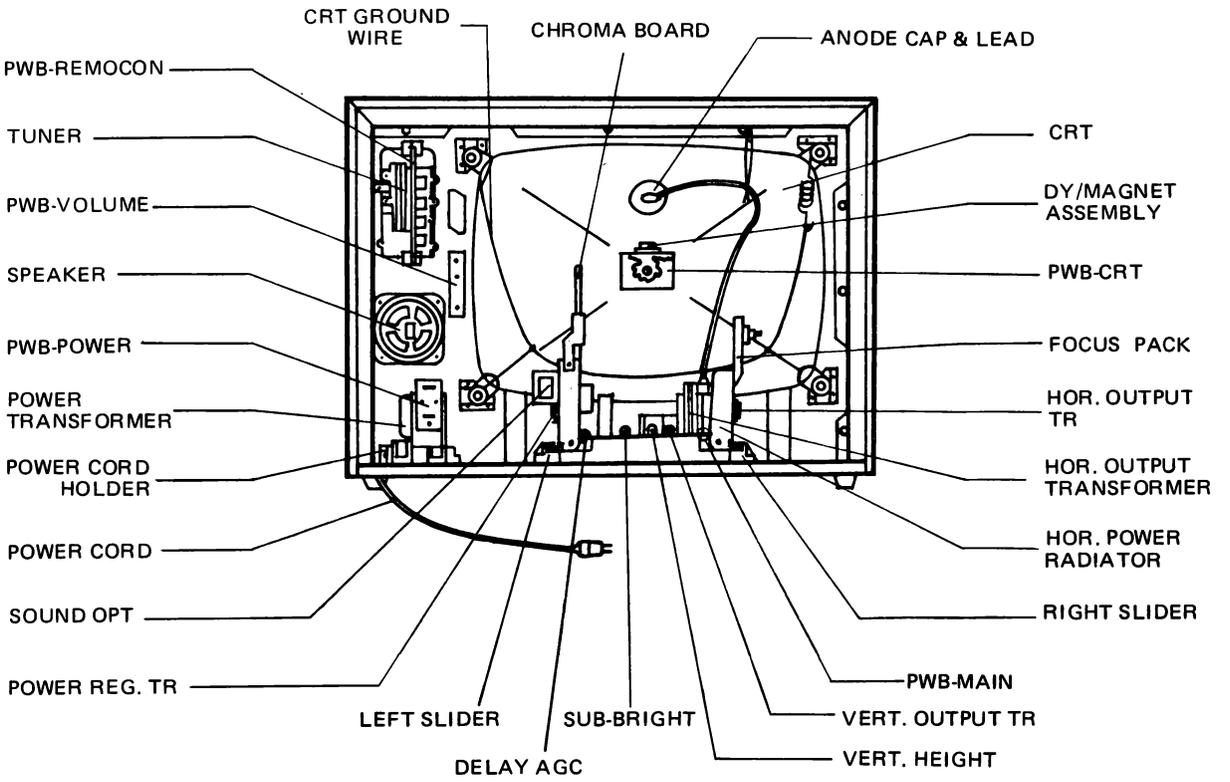
MAJOR CIRCUIT FEATURES

1. A newly-developed surface acoustic wave filter improves the monochrome and colour qualities, the characteristic against interferences and is helpful in minimizing the numbers of parts used and presetting-points.
2. The PIF Amplifier circuit is contained in a single chip of 16-pins MSI (TA7607AP, TDA2544) that simplifies circuit construction and greatly reduces the numbers of parts used.
3. The Sound Output circuit is made up of a transformer equipped with SRPP (Shunt Regulated Push-Pull) circuit that can reduce power consumption, can improve sound quality, and can eliminate heat sinks.
4. The Video circuit uses a pedestal clamp circuit that assures of clear image with stable live tone.
5. The Chroma circuit is made up of a newly-developed 24-pins MSI (TA7193P, KA2151) that provides clear colour picture, being helpful for reducing the numbers of parts used and presetting points.
6. The Sync. Separator, AFC, and Horizontal and Vertical Oscillator and Amplifier circuit is made up of a single chip of newly-developed 16-pin MSI (TA7609P).
7. The High-Voltage circuit uses a newly-developed fly-back transformer that decreases the variation of picture size (vertical height and horizontal width) and reduces dragging of the picture. The raised high-voltage improves focussing to make picture quality better.
8. The Picture Tube used in a 90-degree SSI MARK 11 (Simplified dynamic convergence, Slotted mask In-Line gun) that needs no dynamic convergence, making the drive circuit simple. The colour temperature is changed from 9,300°K to 6,500°K to reproduce natural colours such as flesh tint.
9. On chip 14 channels non-volatile DIFMOS (Dual Injection Floating Gate Metal Oxide Semiconductor) memory, 14 bits for tuning voltage, 2 bits for band, 1 bit for AFT (14 words by 17 bits). (TMS3452N2L)
10. Digital to analog converter with 14 bits resolution.
11. 3 band preset capability (VL, VH and UHF)
12. 14 direct channel Access with neon lamp display.
13. Automatic TV station presetting from VHF low channel.
14. Any channel and any band can be stored in any address in manual presetting mode.
15. Digital AFT with special control logic to maintain optimum tuning point.
16. AFT ON/OFF memory for detuning.
17. Sweep indicator output.

2. FRONT CONTROLS & INSIDE VIEW



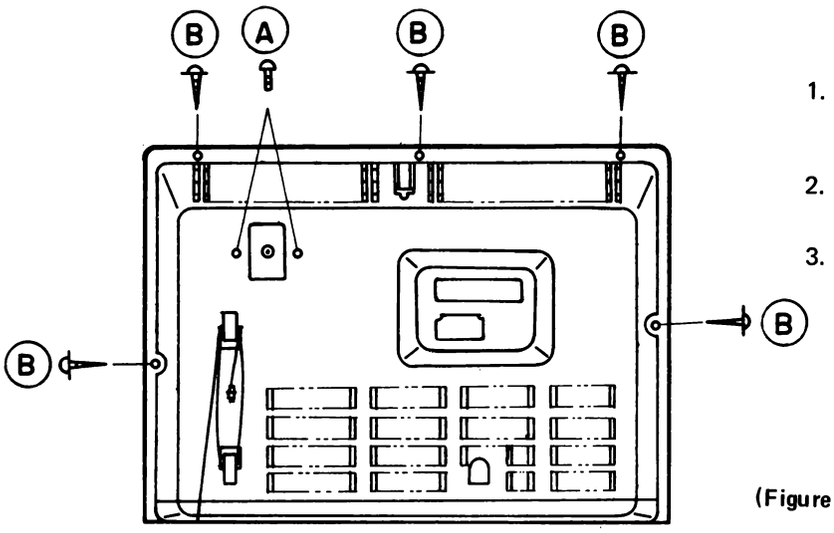
(Figure 1) FRONT CONTROL VIEW



(Figure 2) INSIDE VIEW

3. MECHANICAL DISASSEMBLIES

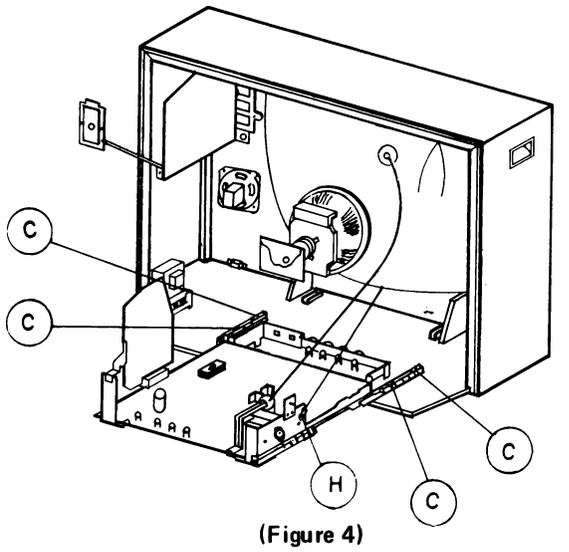
3.1 BACK COVER REMOVAL (See Figure 3)



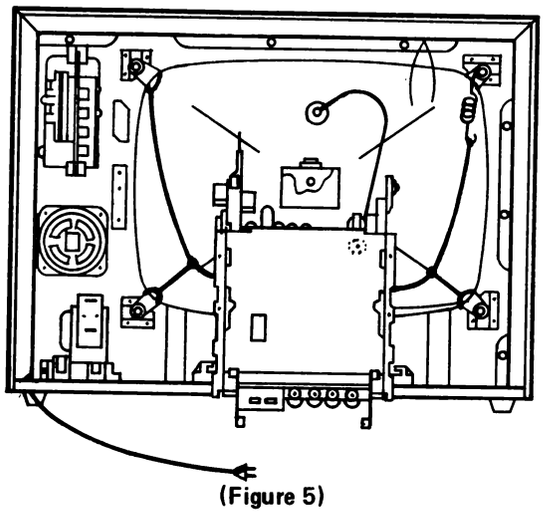
1. Remove 2 screws (A) for separating back cover from the ANT board.
2. Remove 5 screws (B) from the back cover.
3. Remove the back cover.

(Figure 3)

3.2 DRAWING OUT AND SERVICING CHASSIS (See Figure 4, 5)



(Figure 4)

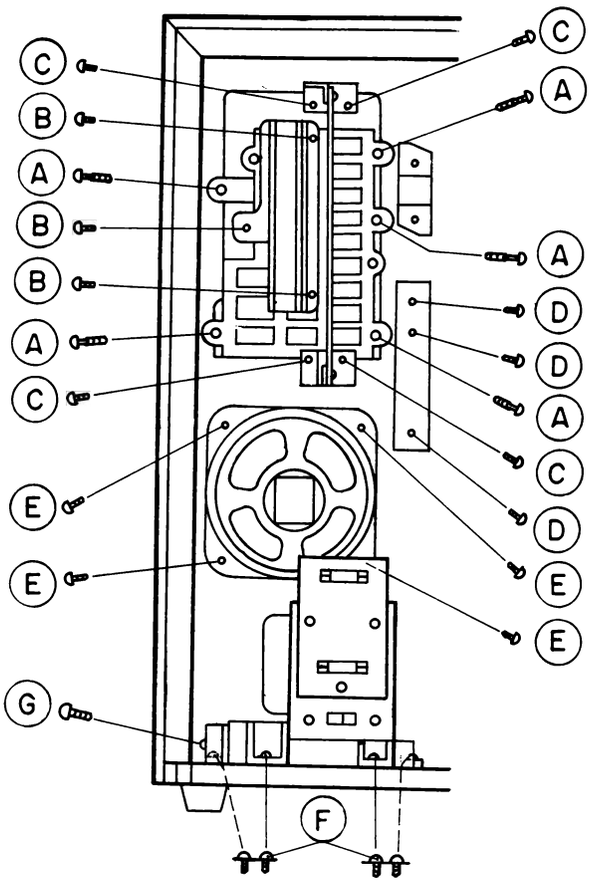


(Figure 5)

Following the steps under "3.1 BACK COVER REMOVAL" proceed as follows:

1. Remove 4 screws (C) securing the chassis from the bottom board of the cabinet. (See Fig. 4)
2. Unfasten the leads which are fastened at the cabinet or others. (See Fig. 4)
3. Draw out the chassis from the cabinet.
4. Lean the fore edge of main chassis against the bottom edge of the cabinet up side down not to touch the live part of the PWB-CRT.
   (See Figure 5)

3.3 ASSY-REMOCON BLOCK REMOVAL (See Figure 6)



(Figure 6)

Following the steps under "3.1 BACK COVER REMOVAL" proceed as follows.

1. Loosen fully 5 screws (A) from the ASSY-REMOCON BLOCK.
2. Remove the ASSY-REMOCON BLOCK from the cabinet.

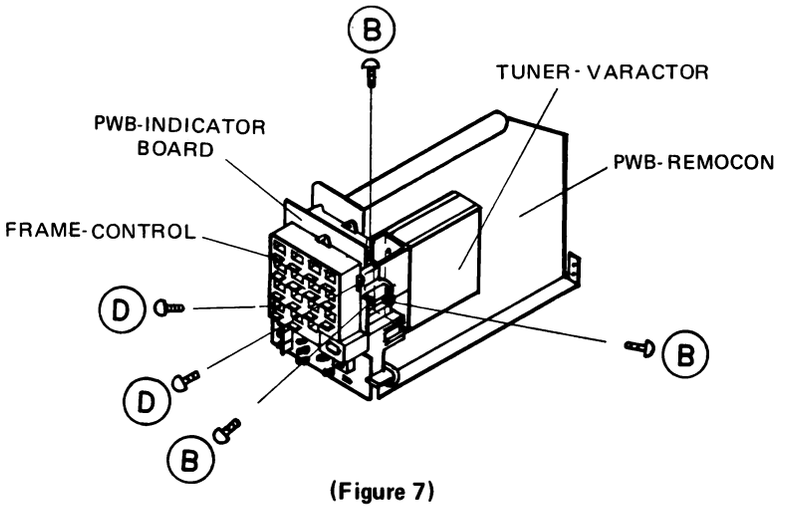
3.4 VHF/UHF TUNER REMOVAL (See Figure 6, 7)

Following the steps under "3.3 ASSY-REMOCON BLOCK REMOVAL" proceed as follows.

1. Remove 3 screws (B) which hold VHF/UHF TUNER from the tuner bracket. (TUNER-VARACTOR)
2. Remove the VHF/UHF Tuner.

3.5 ASSY-PWB, INDICATOR BOARD REMOVAL (See Figure 7)

Following the steps under "3.3 ASSY-REMOCON BLOCK REMOVAL" proceed as follows.
1. Remove 2 screws (D) from the ASSY-REMOCON BLOCK.
2. Remove the frame control and rubber contact from the ASSY-REMOCON BLOCK.



(Figure 7)

3.6 ASSY-POWER TRANSFORMER REMOVAL (See Figure 6)

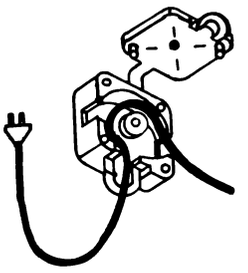
1. Remove 4 screws (F) from the power bracket.
2. Pull up the ASSY-POWER TRANSFORMER.

3.7. ASSY-SPEAKER REMOVAL (See Figure 6)

Following the steps under "3.6 ASSY-POWER TRANSFORMER REMOVAL" proceed as follows.

1. Remove 4 screws (E) from speaker frame, grasping the magnet yoke with one hand.
2. Pull out the speaker with much care.

3.8 POWER CORD REPLACEMENT (See Figure 8)

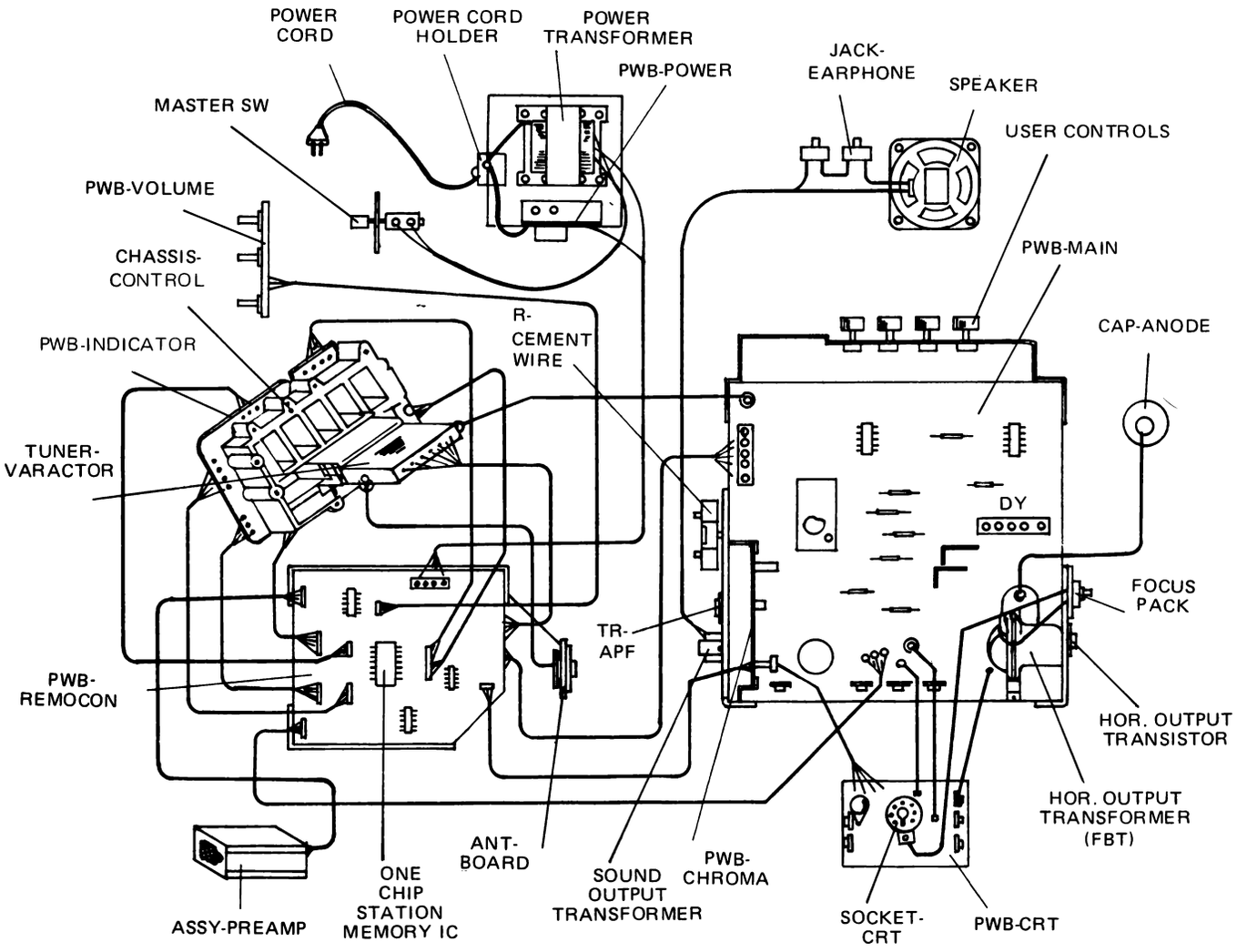


(Figure 8)

When the power cord replacement is required, proceed with the following steps.

1. Unsolder the power cord on the terminals of power transformer and power board.
2. Remove 1 serew (G) clamping the power cord holder.(See Fig. 6)
3. Take out the power cord from the holder.
4. To put on a new power cord, reverse the above procedures for reassembling.

3.9 CHASSIS BRACKET REMOVAL (See Figure 9)

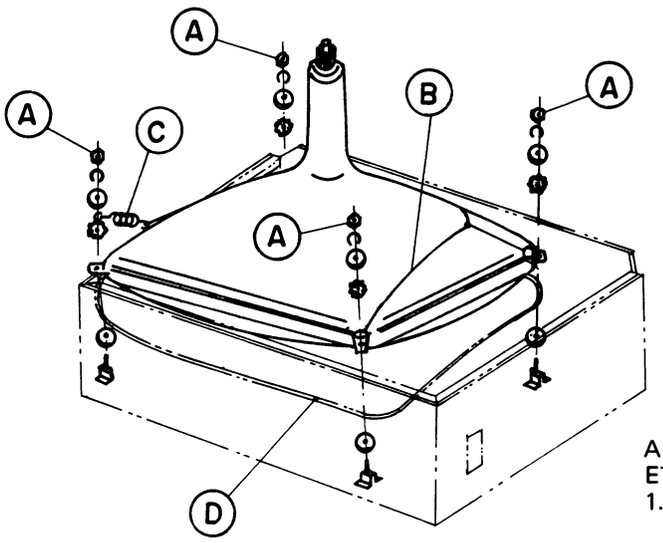


(Figure 9)

Following the steps under "3.6 ASSY-POWER TRANSFORMER REMOVAL", "3.3 ASSY-REMOCON BLOCK REMOVAL", and "3.7 ASSY-SPEAKER REMOVAL" proceed as follows.

1. Pull out 2P connector of degaussing coil leads from the power board.
2. Detach the CRT ground lead from the CRT Drive Board.
3. Detach the deftection yoke from main board.
4. Detach the picture tube anode cap and the CRT Drive board from the picture tube. (See Figure 2)
5. Remove a screw (H) which holds the earth lead to the power radiator. (See Figure 4)
6. Remove 4 screws (C) securing the chassis from the bottom of the cabinet (See Figure 4)
7. Pull back the ASSY-Chassis main.

3.10 PICTURE TUBE REMOVAL (See Figure 10)



(Figure 10)

After following instructions under "3.9 CHASSIS BRACKET REMOVAL", proceed as follows.

1. Place the cabinet with the front down on a rolled pad or suitable cushion placed near the top edge of the picture tube mask.
2. Remove the purity and convergence assembly from the picture tube neck.
3. Loosen the deflection yoke clamp screw and remove the yoke.
4. After removing 4 pairs of nuts and washers securing the picture tube to the cabinet, grasping the face plate of the picture tube with both hands, take out the picture tube from the cabinet.
5. Detach the picture tube ground lead which is attached to the picture tube lugs with spring.
   Notice: Perfectly discharge the high potential of the picture tube before handling the tube.

4. BLOCK DIAGRAM & PARTS LOCATION DIAGRAM

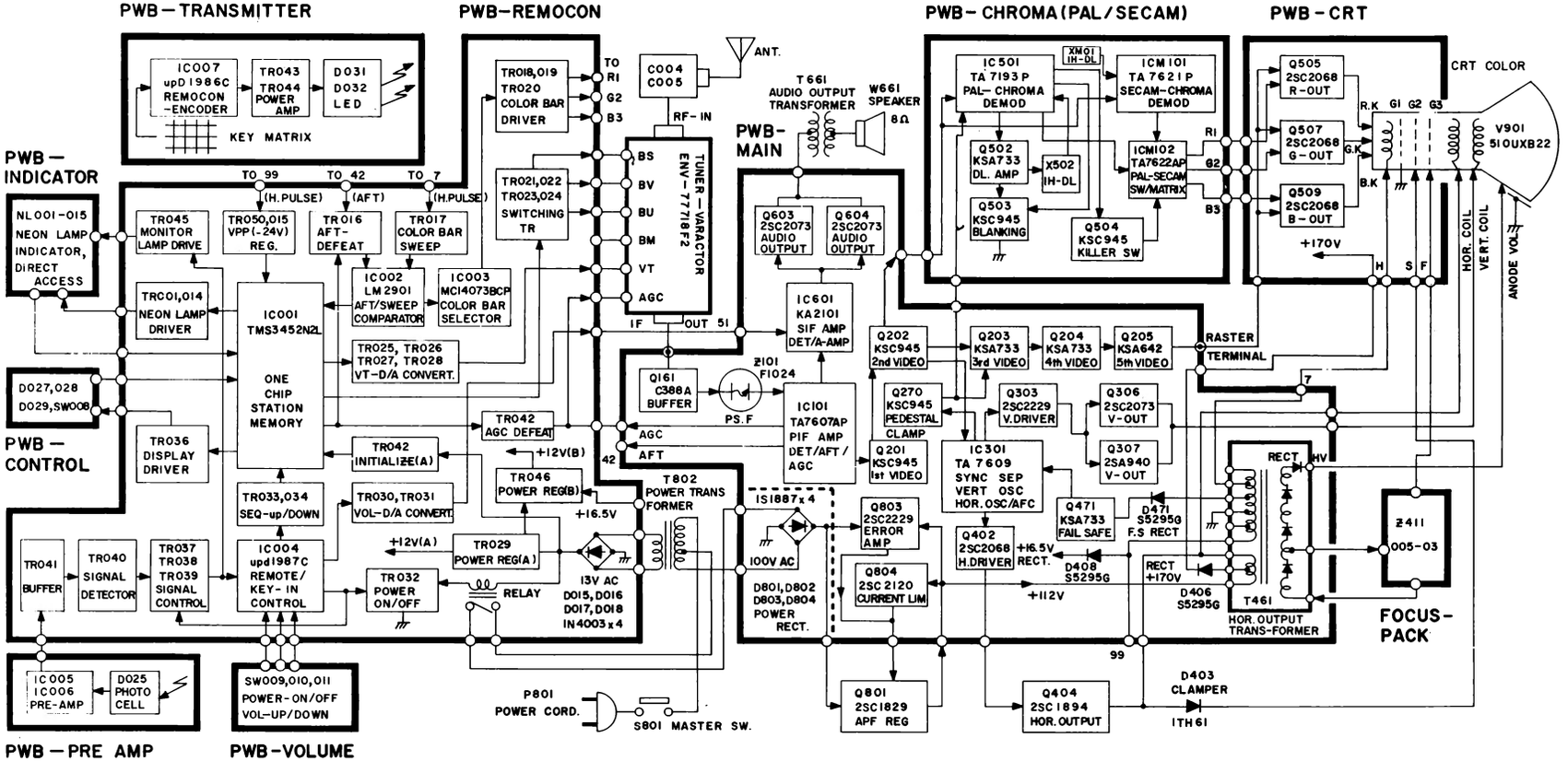


Figure 11. BLOCK DIAGRAM

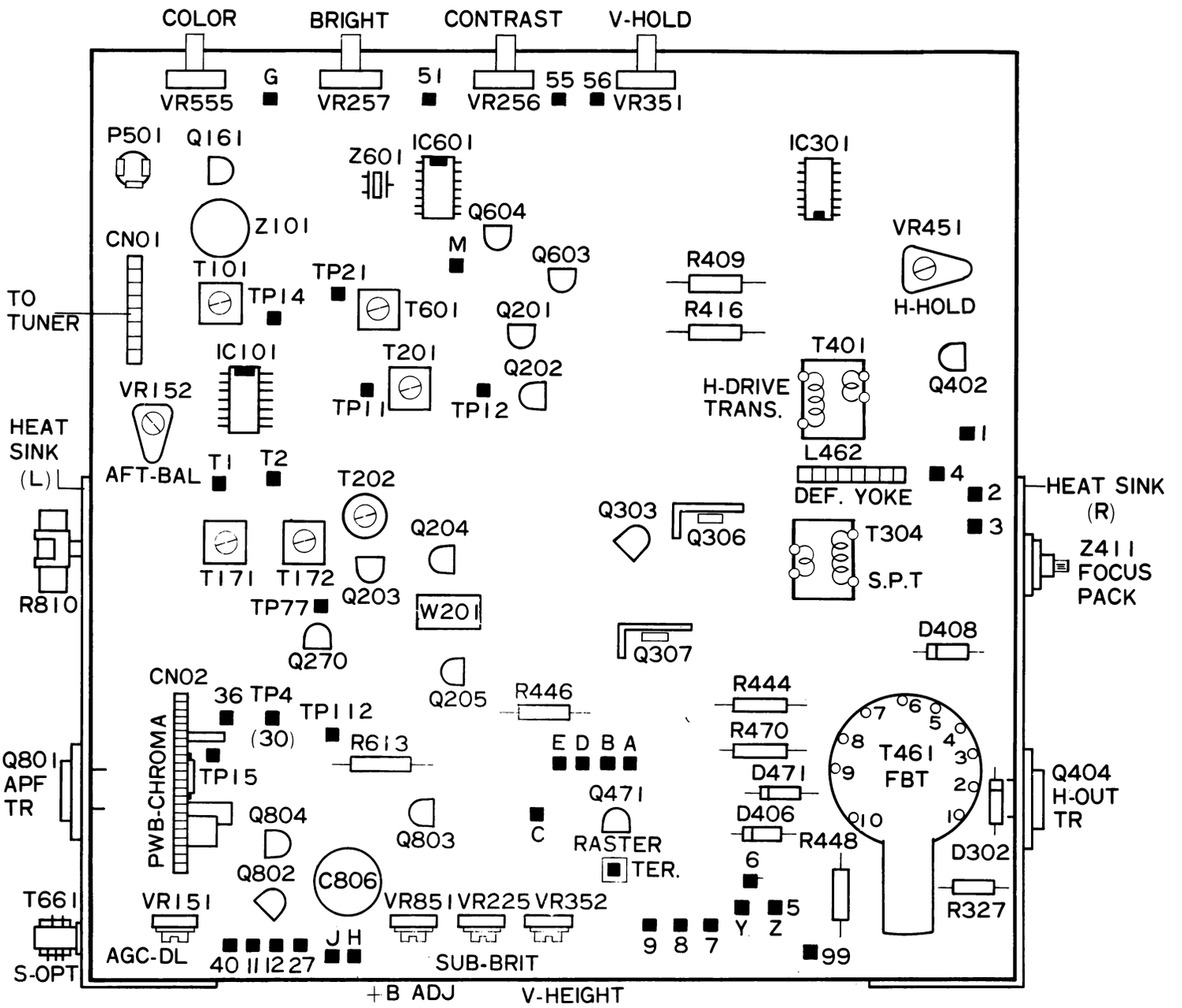
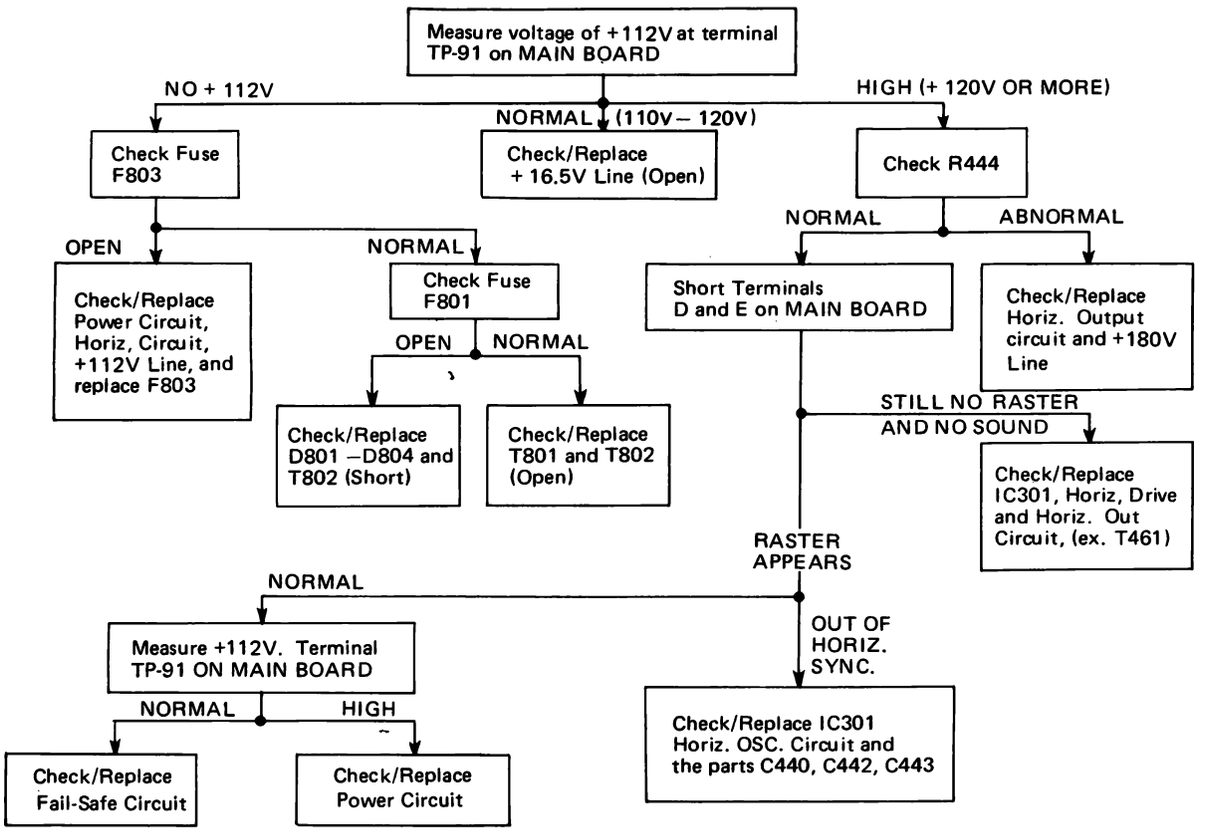


Figure 12. PARTS LOCATION DIAGRAM

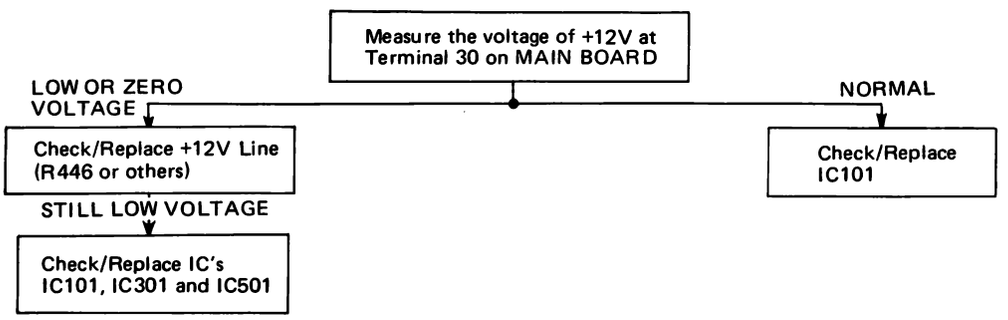
5. TROUBLESHOOTING CHARTS

The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.
In order, to utilize the charts (fault trees), firstly establish the complaint, i.e. – No Raster, No Sound.
Locate the chart applicable and then progress through the various alternatives until a final block indicates the offending components or stage.

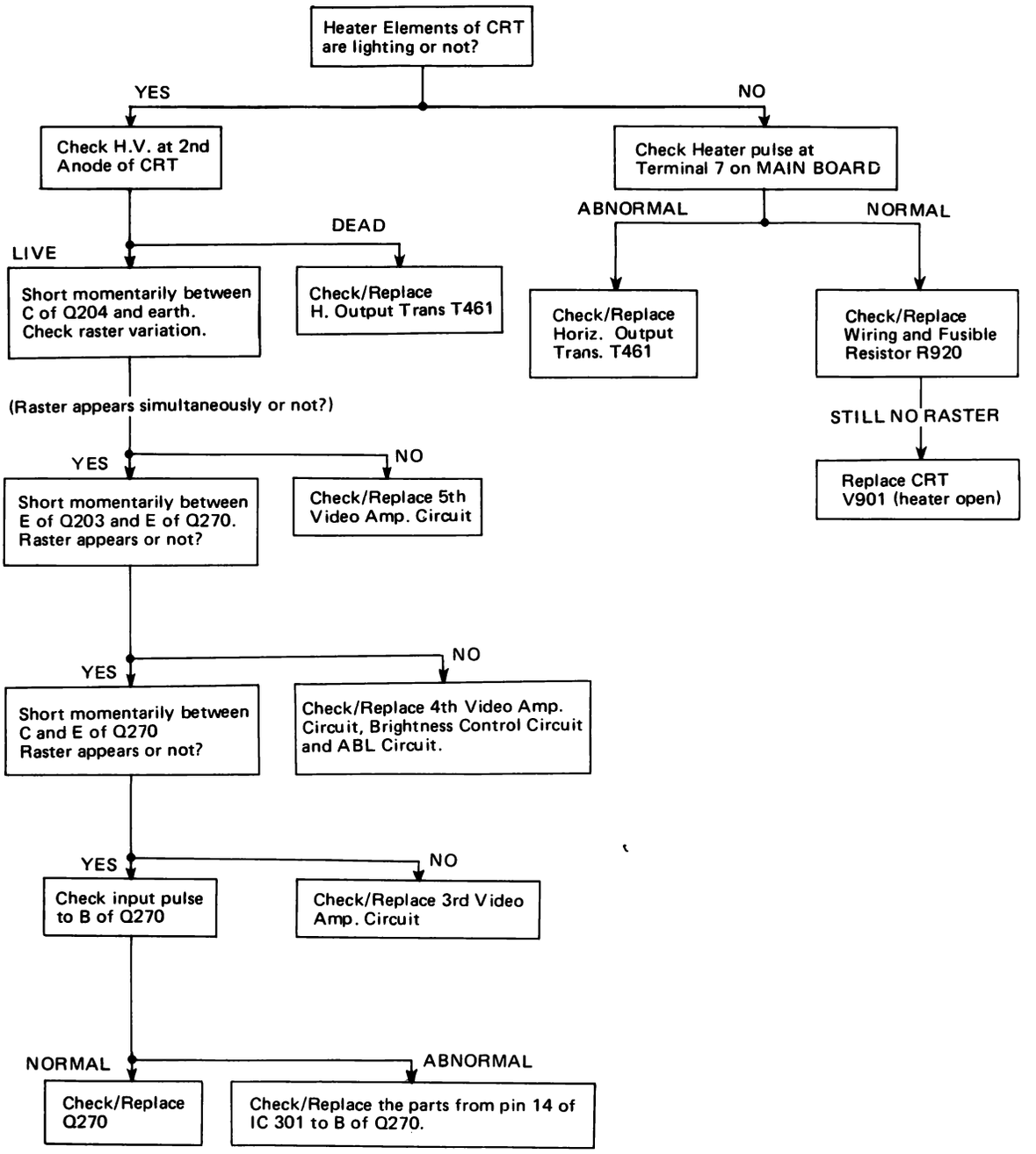
5-1. NO RASTER AND NO SOUND



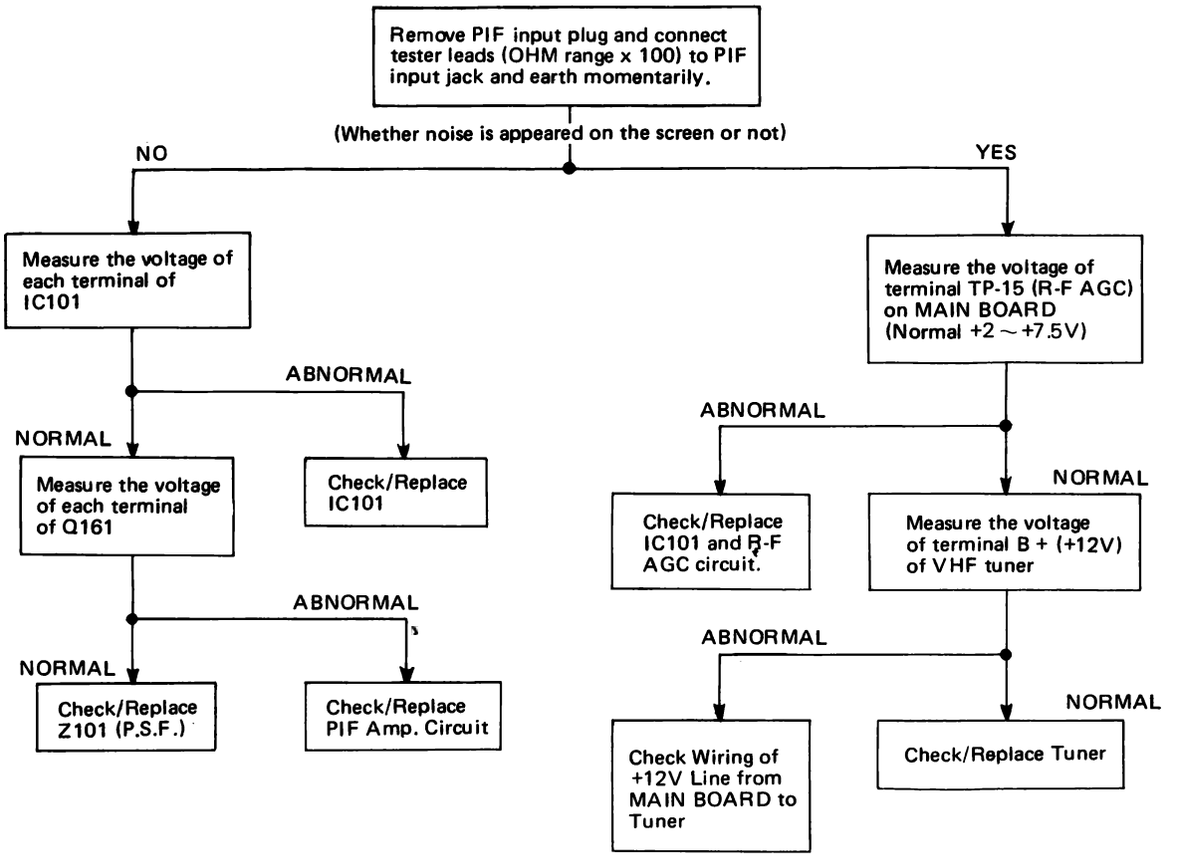
5-2. NO RASTER (SOUND NOISE OR WEAK)



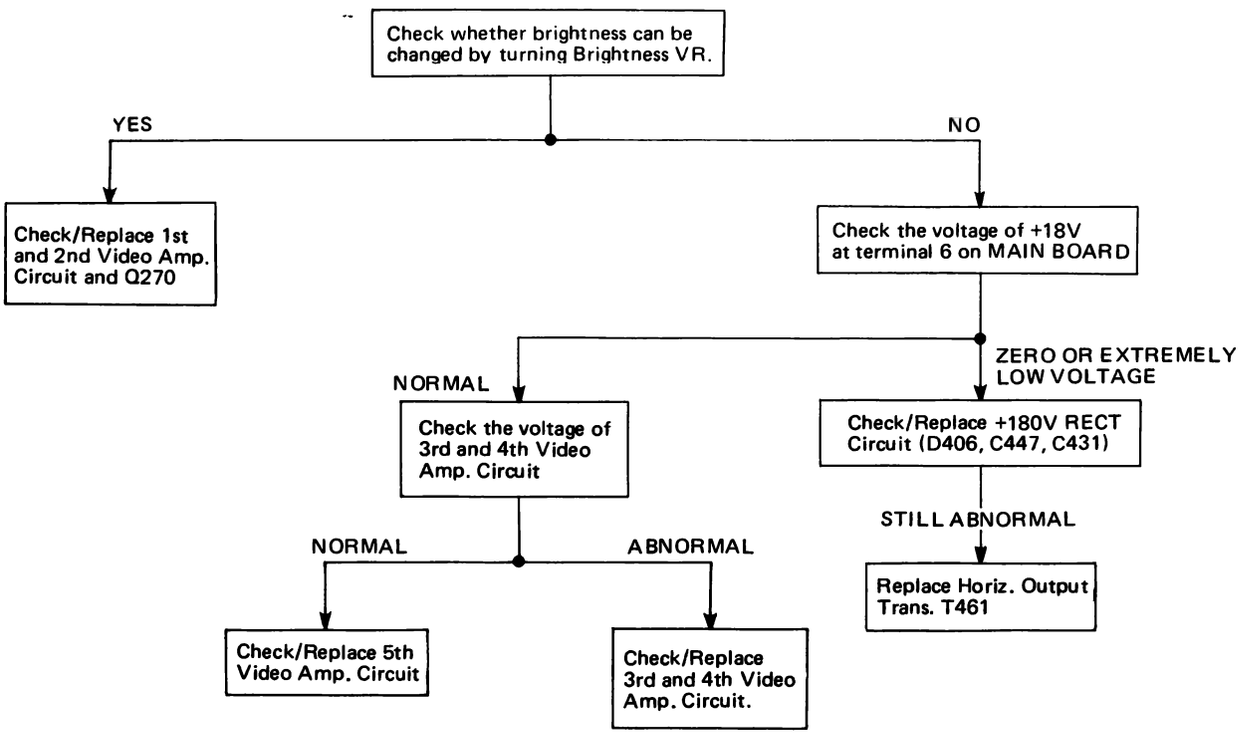
5-3. NO RASTER (SOUND OK)



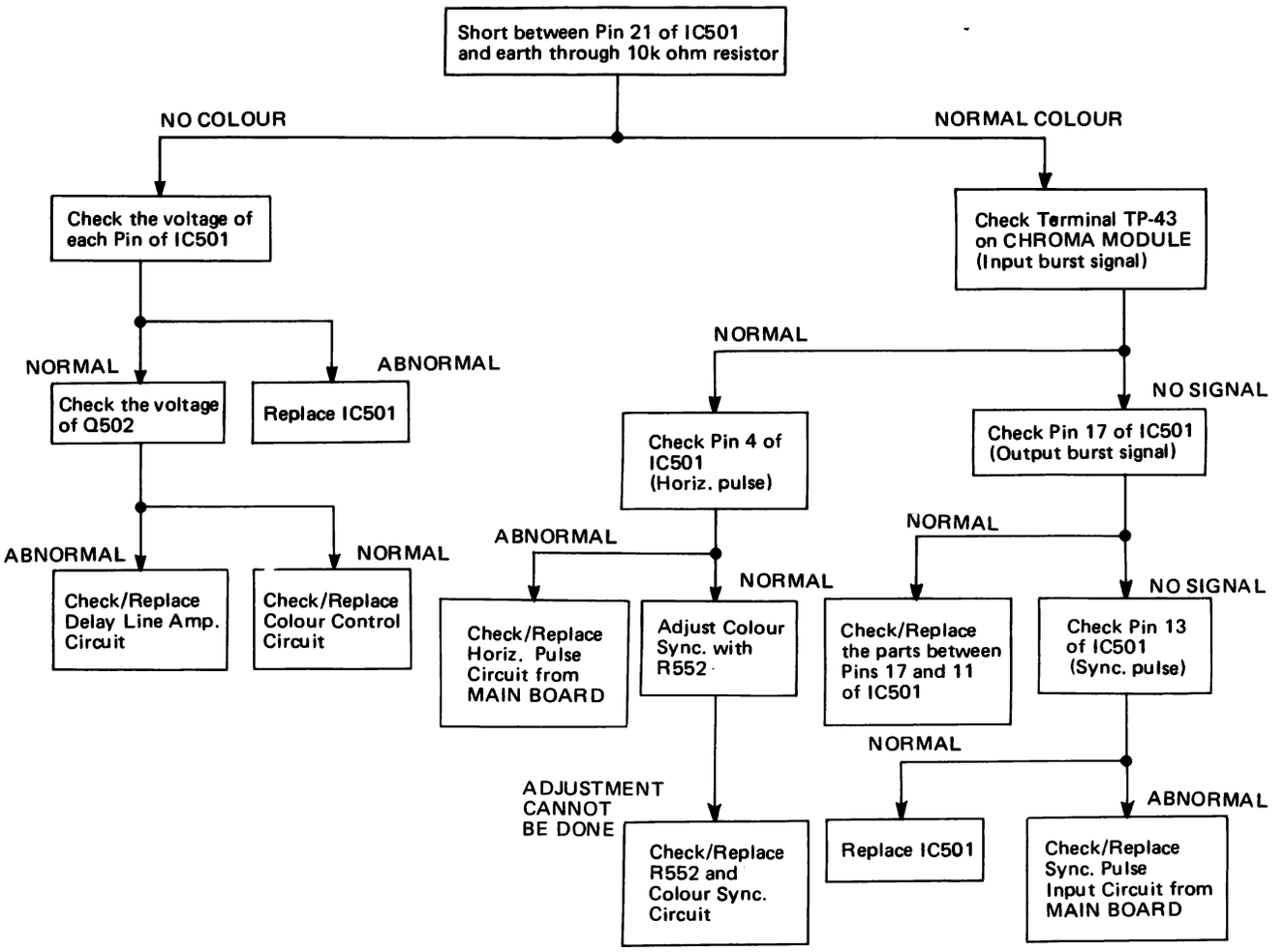
5-4. NO PICTURE (RASTER REMAIN) AND NO SOUND



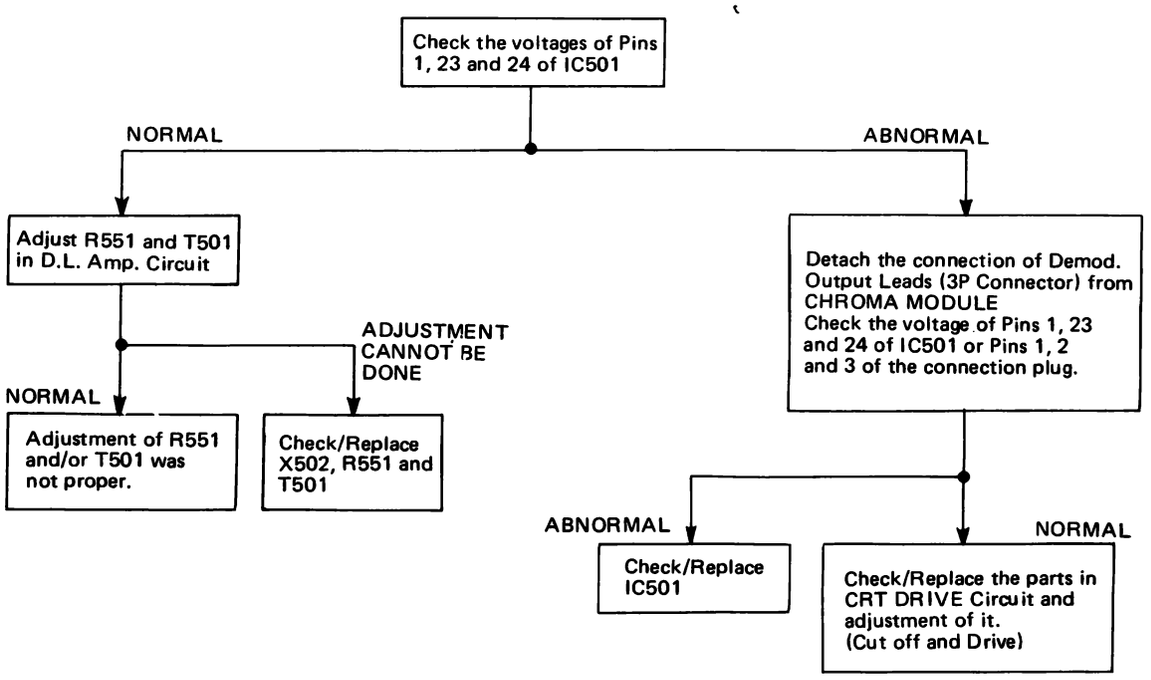
5-5. NO PICTURE (RASTER AND SOUND OK)



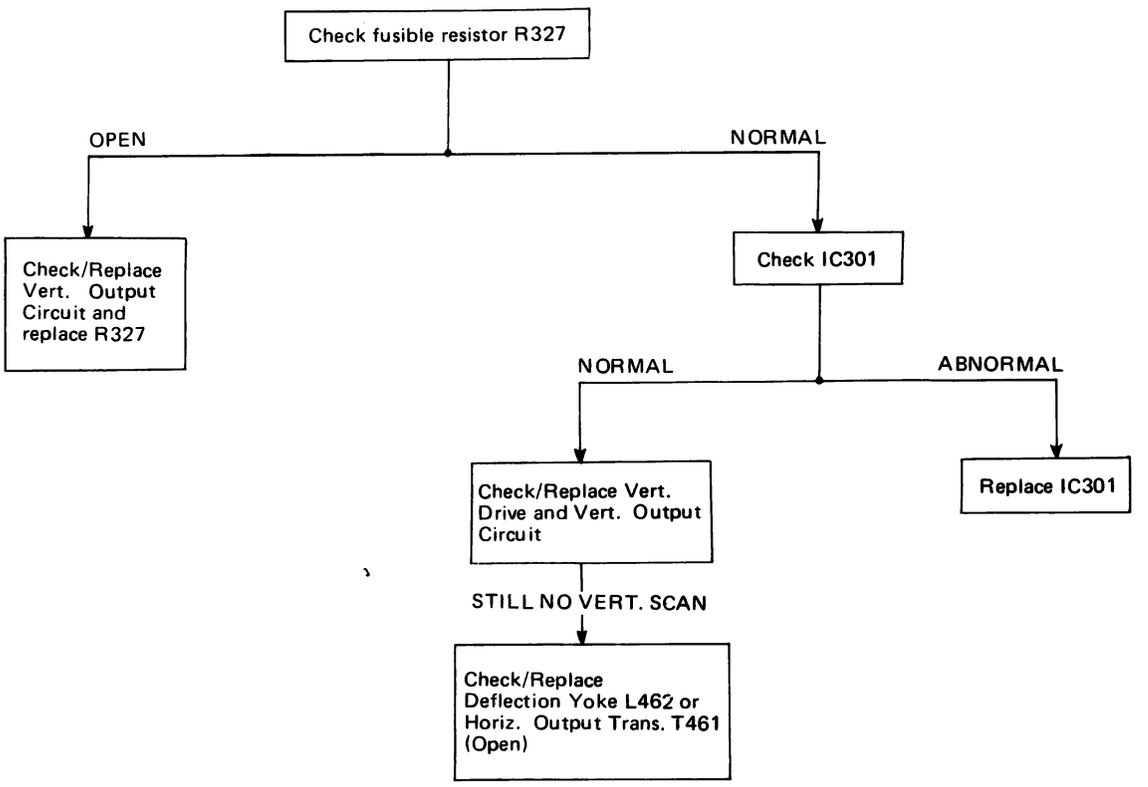
5-6. NO COLOUR



5-7. SPECIFIC TINTED COLOUR



5-8. NO VERT. SCAN (ONE HORIZ. LINE RASTER)



5-9. OUT OF VERT. SYNC. AND HORIZ. SYNC.

Check/Replace Sync. Sep. Circuit from E of Q202 to Pin 16 of IC301 and IC301.

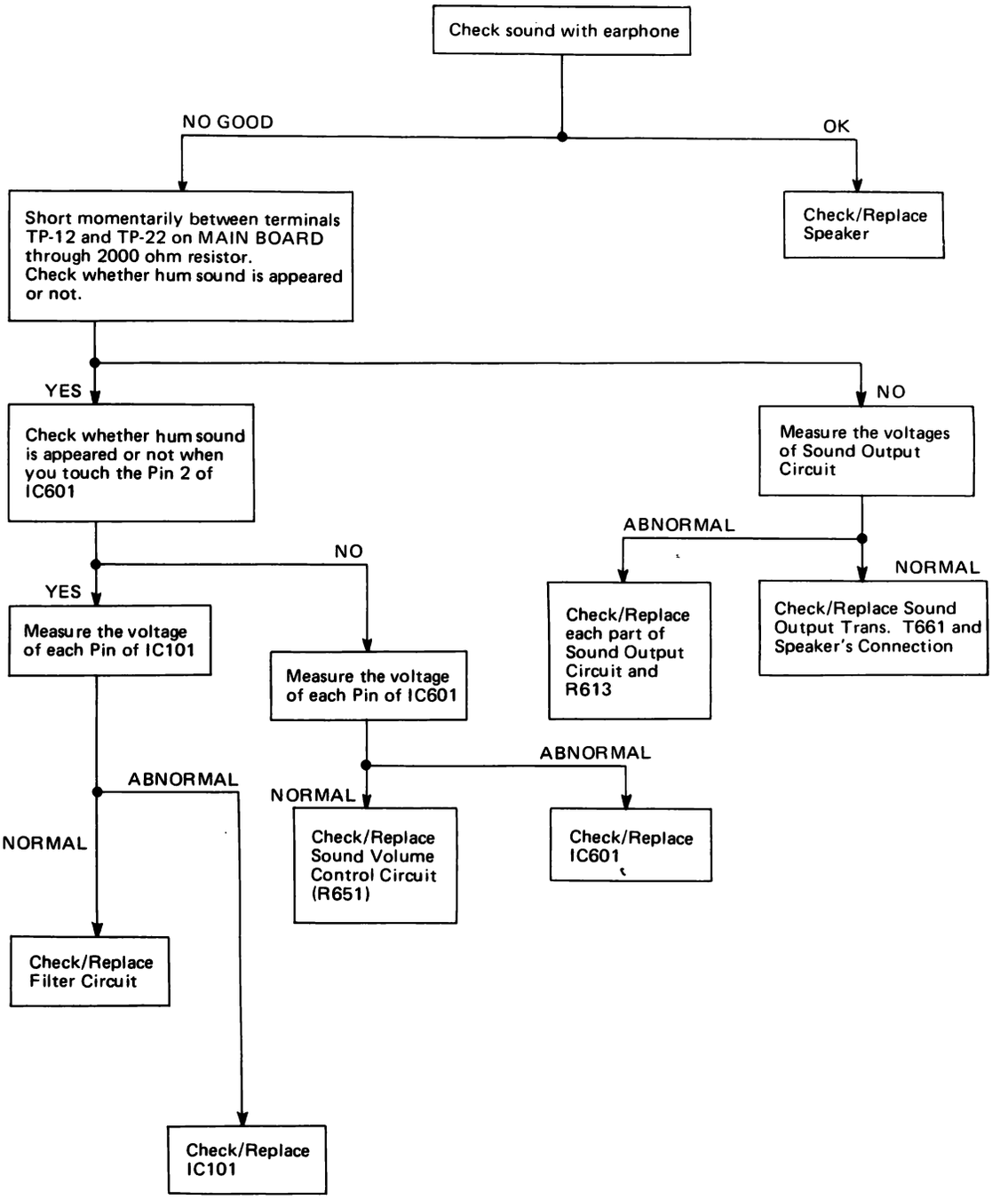
5-10. OUT OF VERT. SYNC.

Check/Replace Vert. OSC Circuit and Vert. Hold Circuit connected to Pins 10, 12 and 13 of IC301
Check/Replace IC301

5-11. OUT OF HORIZ. SYNC.

Check/Replace Horiz. OSC Circuit, Horiz. Hold and Horiz. AFC Circuit connected to Pins 1 and 2 of IC301
Check/Replace IC301

5-12. NO SOUND



NOTE: When a part of Sound Output Circuit or Feedback Circuit is damaged, there is a case that small or distorted Sound appears.

6. SERVICING AID

EXTENSION CABLE

The extension cable is available when servicing the Chroma Module outside the chassis.
This extension cable is;
Extension Cable, 14P, for Chroma Module.
This extension cable will allow rapid inspection and remedy in troubleshooting.
However, as improper response may sometimes be caused by the stray pick-up or stray capacitance of the extension cable, the use of them should be confined to minimum.

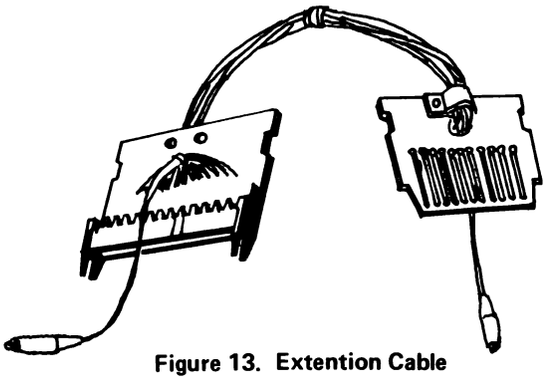


Figure 13. Extention Cable

7. REMOCON FEATURES

7.1 PROGRAMMING METHOD

The TMS3452N contains the following to provide a complete digital TV tuning system by voltage synthesis on one chip:

- o 14 bits digital to analog converter
- o 14 channel address I/O for channel selection and display
- o Band I/O for VHF low, high and UHF
- o Digital AFT control
- o Preset control logic to make programming easy
- o 20 words by 17 bits DIFMOS non-volatile memory (total 340 bits)
- o OSC IN/OUT for 0.8 MHz LC oscillator
- o Remote control
- o Tuning clock generator

PROGRAMMING METHOD

This system has two kinds of programming methods: Manual Fine Tuning and Manual Preset (Search Preset)

1) Manual Fine Tuning
   This is the simplest preset function and is similar to a conventional channel switch system. Holding the MFT UP (or DN) button depressed ramps the tuning voltage up (or dn). When the desired tuning point is found, it is stored in the non-volatile memory by pressing the 'MEMORY IN' button. During this operation, AFT is automatically defeated. During write mode, the band is automatically switched to an upper or lower one upon reaching the highest or lowest end of the tuning voltage. The band also is selectable by means of push buttons. Tuning speeds are 2mV/10mS in VHF and 2mV/40mS in UHF.
2) Manual Preset (Search Preset)
   When a Manual Preset button is pressed after selecting an address and a band, the system searches upward for an active TV station. Searching is stopped when an active broadcasting channel is encountered.
   If this channel is desired, its exact tuning voltage can be memorized by pressing the 'MEMORY IN' button. If not, the Manual Preset button should be pressed repeatedly until the system catches a desired TV station. During this operation, the band is automatically changed upon reaching the highest tuning voltage. Fig. 19 illustrates the flow chart of the exact tuning point detection in Manual Preset. As described in the flow chart, when the system is approaching a carrier; the frequency discriminator in the TV set will prompt first with an 'AFT-UP' command, followed by an 'AFT-DN' command. The trailing edge of 'AFT-UP' changes the tuning speed from COARSE to FINE, and if 'AFT-DN' comes active within about 160 mS from the rising edge of 'AFT-UP', the trailing edge of 'AFT-DN' enables the system to stop the search tuning. If not, COARSE tuning will automatically begin after about 160 mS from the rising edge of 'AFT-UP'. When the system stops, the exact tuning point is computed by the ALU (Arithmetic Logic Unit) as a function of the tuning voltage at the rising edge of 'AFT-UP' and the trailing edge of 'AFT-DN'.

7.2 REMOTE CONTROL OPERATION

1) $\overline{\text{SEQ-UP/DN}}$ CONTROL
A contact closure to ground at pin $\overline{\text{SEQ-UP}}$ (or $\overline{\text{SEQ-DN}}$) or a low state signal from a remote control receiver shifts the address counter forward (reversely) by one step. The required interval of the input pulse train is minimum 200 mS. When $\overline{\text{SEQ-UP}}$ and $\overline{\text{DN}}$ are depressed simultaneously, $\overline{\text{SEQ-DN}}$ dominates. A contact closure to ground for more than 600 mS automatically steps up or dn at intervals of 600 mS until the input goes high.

2) Direct Access
This is one of key features in this system and is very useful for direct access remote control application. An address reset pulse of more than 5 mS duration enables the system. The rising edge presets the memory address register to address L(01011), and the trailing edge enables a high speed pulse train to enter into $\overline{\text{SEQ-DN}}$ input for 140 mS. During this operation, address display and $\overline{\text{SEQ-UP}}$ are inhibited. Fig.15 shows the timing and the equation (A) shows the relationship between the number of pulses and address position.

$$N_p = 12 - N \text{ ----------} \quad \text{(A)}$$

Np ; the number of pulse
N ; address position

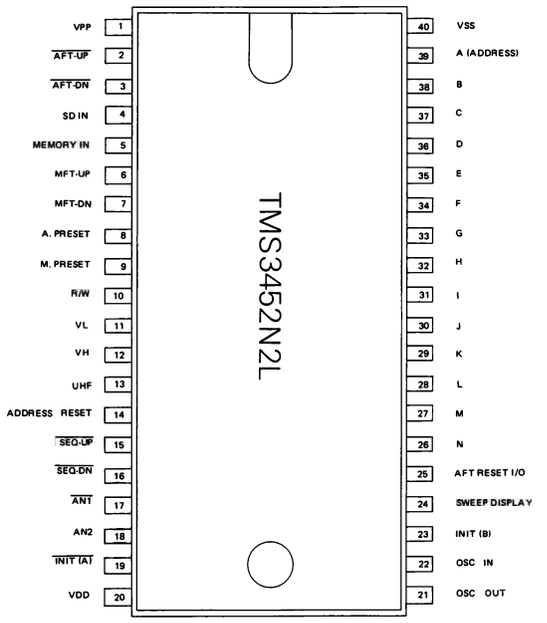


Fig. 14. PIN ASSIGNMENT OF 14 CH VERSION

3) Address input/output Lines A to N;
The basic system has 14 address I/O lines for selection and TAB display (16 address I/O lines as mask option). When power is applied to the circuit, the address is automatically preset to the "A" channel position. When an address line is externally held logically "HIGH" for more than 15 mS, the condition is latched on chip, and the corresponding output buffer is switched on to drive the VLED. All address I/O lines have min. 15 mA current capacity to directly drive a VLED display. During the Automatic Preset and Manual Preset modes, all address inputs are inhibited. When more than two addresses are forced to "HIGH" simultaneously, all their corresponding VLED displays turn on, however, a lesser address I/O line has priority and is selected.

4) Band I/O lines (VHF LOW, VHF HIGH, UHF)
This operation is as the same as the address I/O lines except during read mode. All band inputs are inhibited in case of Automatic Preset, Manual Preset and Read mode. During Read mode, the band I/O lines operate as outputs. The content of the memory selects the VL, VH or UHF output.

5) Read/$\overline{\text{Write}}$ Mode
$\overline{\text{Write}}$ mode is logical "HIGH" and Read mode is logical "LOW". This input has an internal pull-down resistor. During $\overline{\text{Write}}$ mode, Automatic Preset, Manual Preset and Memory In are enabled, and also $\overline{\text{Write}}$ and Erase for DIF MOS memory are enabled. A high-to-low transition ($\overline{\text{Write}}$ mode to Read mode) reads out the stored memory data at the active address location.

6) Memory IN
This input has an internal pull-down resistor. During Write mode, "MEMORY IN" is enabled. The low-to-high transition of a positive going pulse of more than 10 mS width triggers the memory Erase and Write sequence to store the digital word corresponding to the tuning voltage in the DIFMOS memory for about 300 mS. During the memory write sequence, the VLED TAB display for the address is blanked to indicate "MEMORY IN" status. During Read mode, "MEMORY IN" is inhibited.

7) Manual Fine Tuning UP(DN)
These inputs have internal pull down resistors. The tuning voltage is ramped up (down) by 2mV/10mS in VHF and 2mV/40mS in UHF while MFT up (dn) is held logically "HIGH". Once a "HIGH" level has been applied to MFT up (dn), AFT is automatically defeated, and can be reinstated by switching AFT Reset I/O "HIGH". During Write mode, the band is automatically switched whenever the maximum or minimum tuning voltage of the current band is reached.

8) Manual Preset (Search Preset)
When Manual Preset is held logically 'HIGH' for more than 10 mS, the system begins to search for an active TV station by linearly increasing the tuning voltage from the selected tuning voltage and band, when it encounters any active broadcast channel, it stops searching. During the searching operation, a sound muting signal is output from the Automatic Preset pin. Upon reaching the maximum tuning voltage in the current band, the band is changed and searching stops for 500 mS (VHF low to high) or 1S (VHF high to UHF) before starting again. There are two kind of tuning clock which are controlled by $\overline{\text{AFT up/dn}}$ and signal detection input. This function operates during both Read and Write mode.

9) Oscillator input/Output
The frequency of the oscillator is set to approximately 0.8 MHz by means of an LC network or crystal resonator connected to these pins.

10) $\overline{\text{AFT up/dn}}$ (Digital AFT up/dn)
These inputs have schmitt trigger circuits with more than 1 V threshold to prevent misoperation by noisy input signals. During Write mode, whenever Signal Detection input in "HIGH", the trailing edge of $\overline{\text{AFT up}}$ signal changes COARSE tuning to FINE, and the trailing edge of $\overline{\text{AFT down}}$ signal stops the search tuning. In the Automatic Preset mode, these inputs are then inhibited until searching starts again. In both modes, these inputs have the following functions;

AFT-UP	AFT-DN	FUNCTION
H	H	HOLD THE EXACT TUNING VOLTAGE
L	H	TUNING UP
H	L	TUNING DN
L	L	READ OUT MEMORY DATA FOR TUNING VOLTAGE

During Read mode, the AFT function is enabled regardless of the state of signal detection input. The minimum response time is within 160 uS after the signals are applied.

11) Signal Detection
This input has a schmitt trigger circuit to prevent misoperation by a noisy input signal. During write mode, the AFT function is enabled when the signal detection input is logically "HIGH" and is inhibited when it is "Low." The reponse time is within 160μS.

12) $\overline{\text{Initialize (A)}}$
A logical "LOW" on this input initializes all internal logic and inhibits all operation except the oscillator circuit and the scanning counter. The sound defeat output is kept "HIGH". The rising edge of this input reads out the tuning voltage data from DIFMOS memory of an addressed word. In an application with standby power, the last channel is remembered.

13) Initialize (B)
When Initialize (A) is held logically, "LOW", the rising edge of this input presets the address register to address A position (000000).

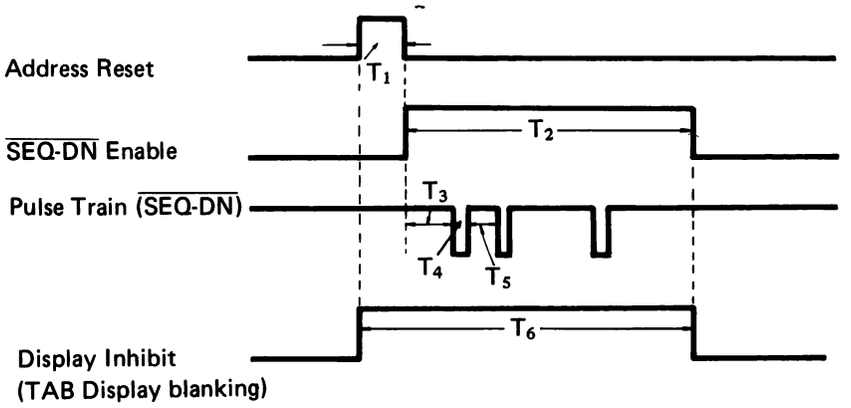
14) Address Reset
This terminal is useful for remote control application, and must be held "HIGH" for more than 5 mS for trouble free operation. The rising edge presets the address register to address L*(01011) and the trailing edge enables a high speed clock to enter into $\overline{\text{SEQ-DN}}$ for 140 mS. During this operation, address display and $\overline{\text{SEQ-UP}}$ are inhibited.

15) $\overline{\text{Sequential UP/DN}}$
In case of no Address Reset input signal, when a negative going pulse with 5 mS~600 mS width is applied into $\overline{\text{SEQ-UP}}$ ($\overline{\text{SEQ-DN}}$), the address is shifted forward (reversely) every one pulse. The required interval of the input pulse train is minimum 200 mS. When $\overline{\text{SEQ-UP}}$ and $\overline{\text{DN}}$ are depressed simultaneously, $\overline{\text{SEQ-DN}}$ dominates. If the input pulse has more than 600 mS width, the address is automatically shifted forward (reversely) at intervals of 600 mS, and it stops when the input goes high. (In case of applying input signal during Address Reset, refer to the description of its pin)

16) AFT RESET INPUT/OUTPUT
This terminal is commonly used as an input/output. The output is "HIGH" during AFT "ON" mode and "LOW" during AFT "DEFEAT" mode. During AFT "DEFEAT" mode, AFT "ON" mode is recovered by applying a logical "HIGH" into this terminal. The AFT STATUS can be memorized.

17) Sweep Display
During Manual Preset, the pulse train at intervals of about 160 mS is available. Otherwise, this output remains high.

18) $\overline{\text{AN1}}$/AN2 Output
A tuning voltage is synthesized by $\overline{\text{AN1}}$ and AN2 in the external circuit with the level converter and integrator. $\overline{\text{AN1}}$ is generated by an 11 bit DA converter with combination of 7 bits PWM (Pulse width Modulation) and 4 bits BRM analog format, and AN2 is generated by a 3 bit DA converter with BRM (Binary Rate Multiple) analog format. Synthesis of $\overline{\text{AN1}}$ and AN2 gives 14 bits resolution with about 2mV step and 0.5 to 32V voltage variation in a 33V voltage reference. The fundamental cycle width is about 2.5 mS and is divided by 16 pulses with a period of approximately 160 μS as shown in Fig. 16. The $\overline{\text{AN1}}$ and AN2 outputs have a maximum 300 nS phase difference between the rising edge of $\overline{\text{AN1}}$ and the trailing edge of AN2 to minimize voltage offset.



T_1, T_3 : Minimum 5 mS Required
T_2 : 140 mS
T_4 : more than 160 μS Required
T_5 : more than 160 μS Required
T_6 : more than 145 mS

Figure 15. TIMING OF DIRECT ACCESS

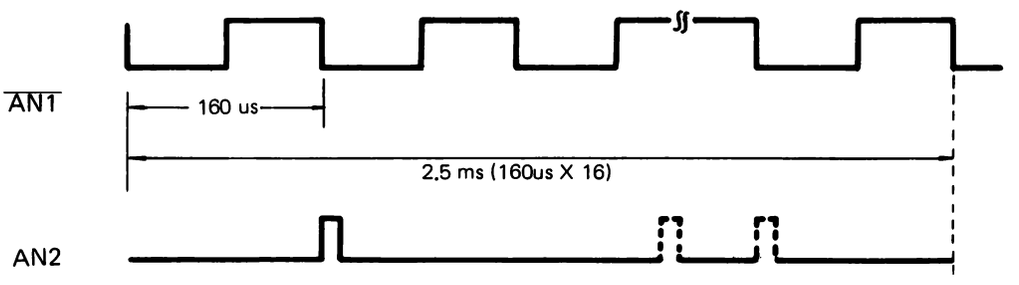
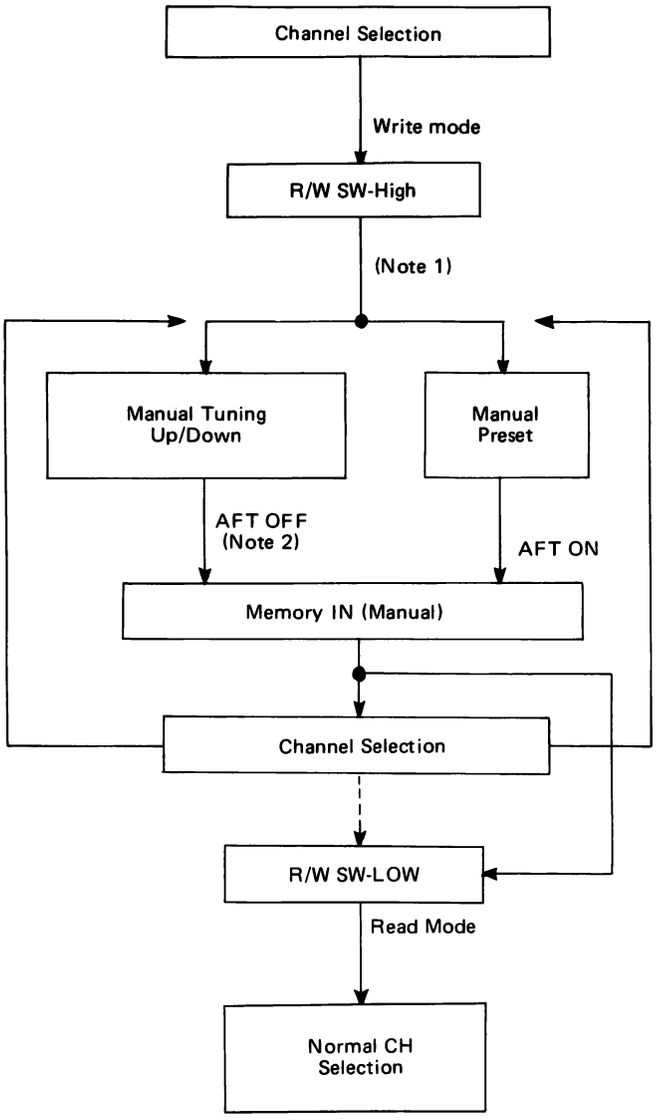


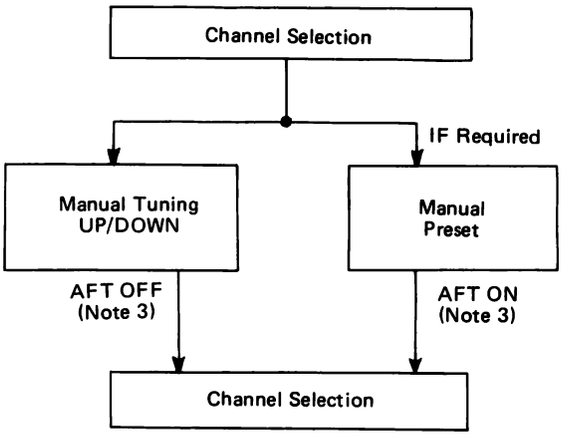
Fig. 16. THE WAVE FORM OF $\overline{\text{AN1}}$ AND AN2

7.3 READ/WRITE PROCEDURE

1) WRITE MODE (PRESETTING)



2) READ MODE



Note 1; Band Selectable
2; AFT Bit High
3; Independance of Memory Content (AFT Status)

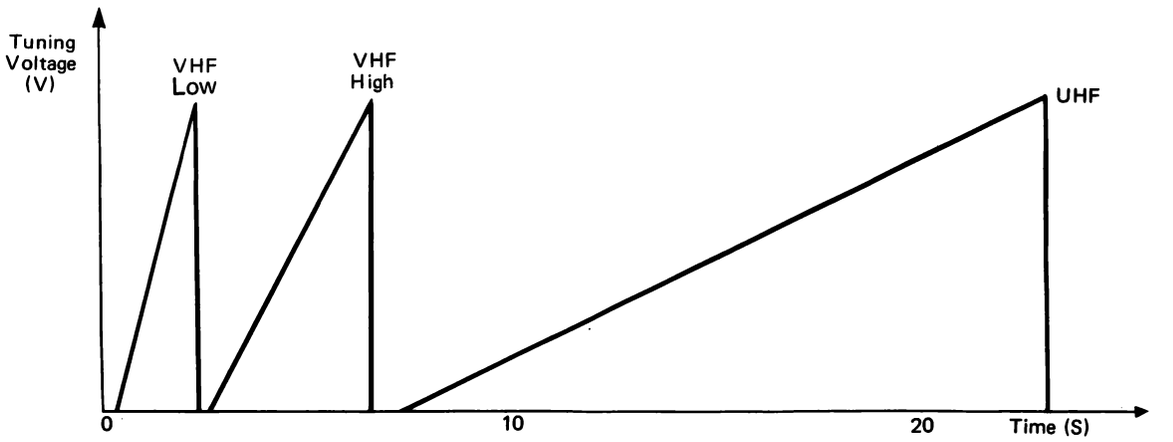


Fig. 17. Sweep Time in Coarse Tuning

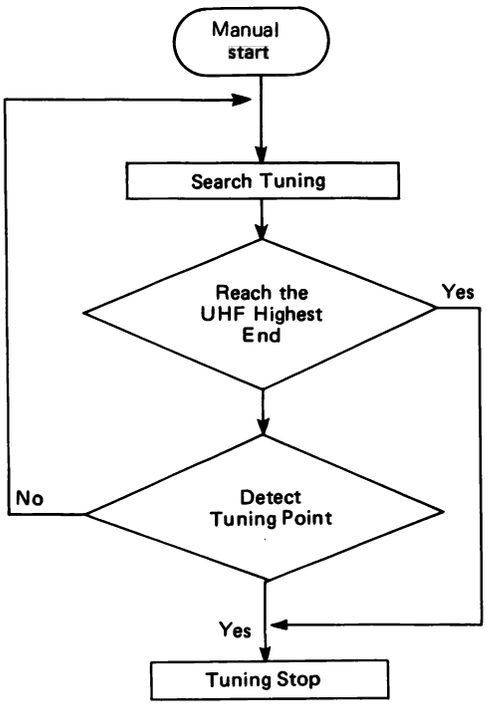


Fig. 18. Flow Chart of Manual Preset

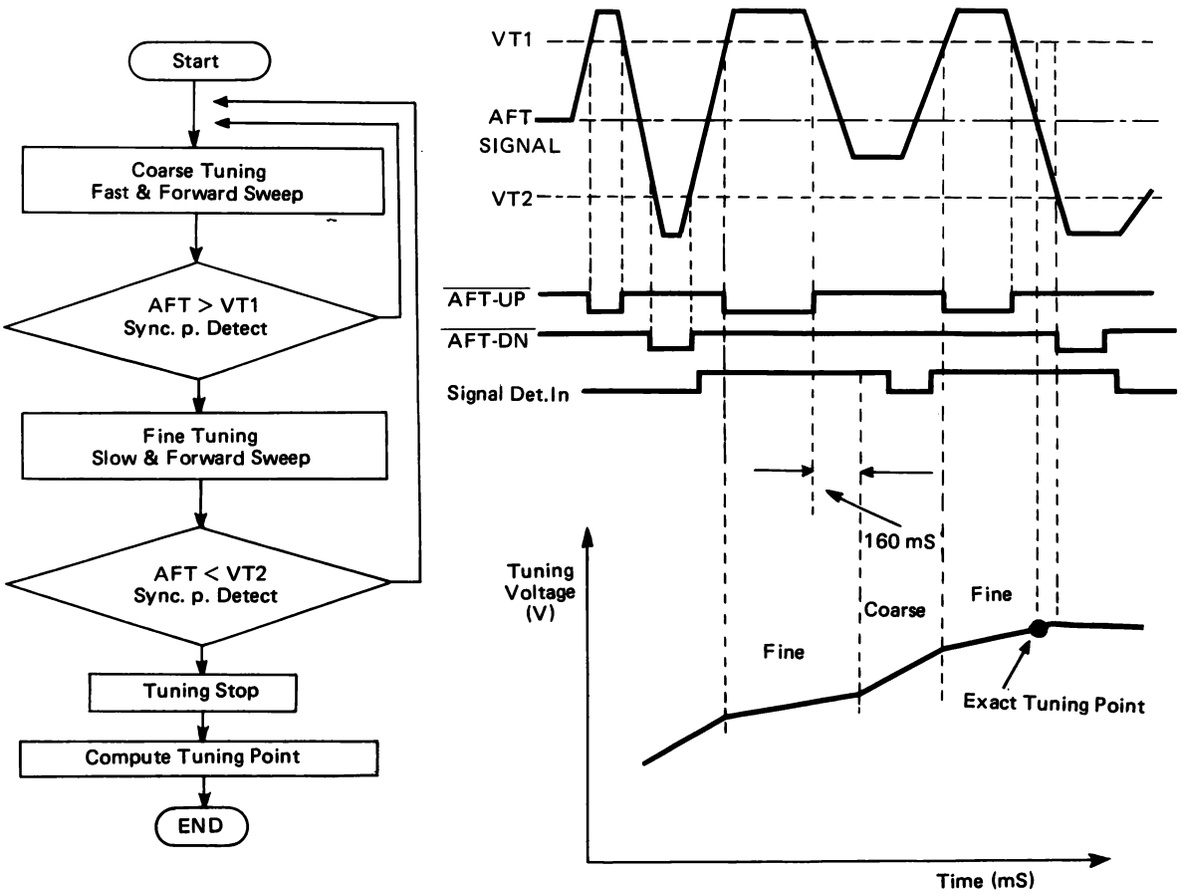


Fig. 19. Flow Chart of Tuning Point Detection

8. INSTALLATION AND SERVICE ADJUSTMENTS

8-1. GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, serveral minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials.

Plug the power cord into a convenient 220V (or 110V, 240V), 50/60Hz, AC two pin power outlet or frequency.

Turn the receiver ON and adjust the fine tuning for best picture detail.

Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

8-2. AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 10 minutes in order that the automatic degaussing circuit operates properly.

Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and from of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures, as mentioned later.

8-3. +112 VOLT POWER SUPPLY ADJUSTMENT

CAUTION: B+ voltage closely relates to the high voltage. To prevent hazardous X-RAY RADIATION, the B+ voltage must be properly adjusted to +112 volts.

1. Tune in an active channel. Adjust the BRIGHTNESS and CONTRAST Controls for normal picture.
2. Check that the AC power line voltage is normal. (220V or 110/240V, 50/60Hz.)
3. Connect a VTVM between Terminal TP-91 on MAIN Board and chassis ground.
4. Adjust the B+ ADJ. (R851) on MAIN Board for +112 volts reading. Remove the VTVM.

8-4. HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis. The +112 volt power supply must be properly adjusted to insure the correct high voltage.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 27.5kV
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 27.5 kV. under any conditions.

8-5. FS CIRCUIT CHECK

The Fail Safe (FS) circuit check is indispensable for the final check in the servicing. Checking should be done following the steps below.

1. Push the power switch on and adjust customer controls for normal operation.
2. Temporarily short terminal A and terminal B on MAIN Board with a jumper wire. Raster and sound will disappear.
3. The receiver must remain in this state even after removing the jumper wire. This is the evidence that the FS circuit is functioning properly.
4. To obtain a picture again, temporarily turn the receiver off and allow 30 seconds to reset the FS circuit to stand-by state. Then push the power switch on to produce a normal picture.

8-6. HORIZONTAL OSCILLATOR ADJUSTMENT

If there is an indication of unstable horizontal sync., adjust the HORIZONTAL HOLD Control (R451) to remove the condition. Adjust the HORIZONTAL HOLD to the centre of the pull-in range.

8-7. VERTICAL OSCILLATOR ADJUSTMENT

If the picture moves up or down on the screen, adjust the VERTICAL HOLD Control (R351) on MAIN Board until there is a single image without vertical movement.

8-8. VERTICAL HEIGHT ADJUSTMENT

HEIGHT Control (R352) on MAIN Board changes the size of the picture or pattern, having an equal effect on the top and bottom. Make final adjustment to overscan the mask 2cm at the top and bottom.

8-9. FOCUS ADJUSTMENT

Adjust FOCUS Control on FOCUS PACK (Z411) for well defined scanning lines in the centre area of the screen.

8-10. DELAYED R-F AGC ADJUSTMENTS

1. Tune the set in the strongest station in your area.
2. Turn AGC-DELAY Control (R151) on MAIN Board to fully counterclockwise position.
3. Adjust AGC-DELAY Control clockwise until noise (snow) disappears from the screen.

8-11. AFC (Automatic Frequency Control) FIELD ALIGNMENT

1. Place AFC Switch in OFF position. Tune the set to an active channel and adjust tuning meter for best picture.
2. Place AFC Switch in ON position, and adjust Trans. (T172) on MAIN Board for best picture. Picture quality should be the same as that obtained in Step 1.
3. Check the AFC action by turning the fine tuning clockwise and counterclockwise.

8-12. COLOUR SYNC. ADJUSTMENT

1. Turn in a colour program and warm up for five minutes.
2. Connect terminal TP-43 and the module earth with the short jumper wire.

3. Connect the 21th pin of IC501 and the module earth with 10K ohm resistor so that the colour killer turns off.
4. Then the colour stripes appear on the screen when the adjustment is incorrect. Adjust the colour sync. VR (R552) so that the colour bar pattern stands still or drifts slowly across the picture screen.
5. Remove the 10K ohm resistor.

8-13. PAL MATRIX ADJUSTMENT

1. Tune in the colour program including the colour bar signals.
2. Set the colour Control VR to obtain the proper colour.
3. If the PAL MATRIX adjustment is incorrect, the Venetian Blind would appear in the colour bars area. This case needs the adjustment.
4. At the first, adjust DL PHASE ADJ. Coil T501 to minimize the Venetian Blind.
5. Next, connect the terminal TP43 and the module earth with capacitor (30 pfd—50 pfd). If the Venetian Blind appears, adjust DL ADJ. VR (R551) to minimize the Blind.
6. Remove the capacitor, and if the Venetian Blind still remains, adjust DL PHASE ADJ. Coil T501 to minimize the Blind again.
7. Repeat the item 5 and 6 procedures, adjust the R551 and T501 until the Blind don't appear when the capacitor is connected.

8-14. SIF DET. COIL ADJUSTMENT

(This adjustment needs the oscilloscope)

1. Tune in a program which has a pure tone. (For example 400 Hz or 1 kHz)
2. Connect the probe of oscilloscope to terminal M on Main Board.
3. Adjust SIF DET. COIL T601 so that the detected signal amplitude (pure tone) goes to maximum.

8-15. COLOUR PURITY ADJUSTMENT

Note: Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes. Purity adjustment requires Rubber Wedge kit.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Turn the CONTRAST and BRIGHTNESS Controls to maximum.
3. Adjust RED and BLUE CUT OFF controls (R557 and R559) to provide only a green raster. Advance the GREEN CUT OFF Control (R558) if necessary.
4. Loosen the clamp screw holding the yoke, and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and Spread the tabs of the purity magnet (See figure 21) around the neck of the picture tube until a green belt is obtained in the centre of the screen. And at the same time, centre the raster vertically by adjusting the magnet.
7. Move the yoke slowly forward or backward until a uniform green screen is obtained. Tighten the clamp screw.
8. Check the purity of the red and blue raster by adjusting the CUT OFF Controls.
9. Tighten the clamp screw of the yoke temporarily.
10. Obtain a white raster; referring to "CRT GREY SCALE ADJUSTMENT".
11. Proceed with convergence adjustment.

8-16. CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Set the COLOUR Control to minimum.
3. Turn the SCREEN Control (R951) fully counterclockwise.
4. By rotating the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) clockwise from the maximum, set them to the position where notches of the knobs become parallel to the surface of the Board.
5. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the mid position.
6. Disconnect the RASTER TERMINAL on the Main Board.
7. Short temporarily terminals J and H on the Main Board with a jumper wire.
8. Rotate the SCREEN Control (R951) gradually clockwise until the second horizontal colour line following the first line appears slightly on the screen. Then turn fully counterclockwise the two CUT OFF Controls corresponding to the colours of the first and the second horizontal lines to eliminate the lines.
9. Set the SCREEN Control to the position where the third horizontal line lights slightly on the screen.
10. Adjust the two CUT OFF Controls set to the minimum in item 8 above to obtain the slightly lighted horizontal line in the same levels of three (red, green, blue) colours. (The line may look like white if the CUT OFF Controls are adjusted properly.)
11. Remove a jumper wire between terminals K and H and reconnect the RASTER TERMINAL.
12. Rotate the BRIGHTNESS and CONTRAST Controls to the maximum.
13. Adjust the BLUE and GREEN DRIVE Controls to obtain proper white-balanced picture in high light areas.
14. Rotate the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.

8-17. SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour program.
2. Set the CONTRAST Control to the maximum and the BRIGHTNESS Control to the centre.
3. Set the COLOUR to the centre.
4. Set the SUB-BRIGHT. Control (R255) to the centre and leave the receiver for five minutes in this state.
5. Watching the picture well, adjust the SUB-BRIGHT, Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
6. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the Controls turned to the maximum, adjust the SUB-BRIGHT Control again for the acceptable picture.

8-18. CONVERGENCE ADJUSTMENTS

Note: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

- **Centre Convergence Adjustment**

1. Receive crosshatch patten with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 21) and superimpose red and blue vertical lines in the centre area of the picture screen. (See figure 21)
4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 22)
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 with understanding red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual affection and it makes dots movement complex.

■ **Circumference Convergence Adjustment**

1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Put a wedge as shown in figure 20 temporarily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 22.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 20)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it one picture tube to fix the yoke.
8. After fixing three-wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is film.
9. Stick 3 adhesive tapes on wedges as shown in figure 20.

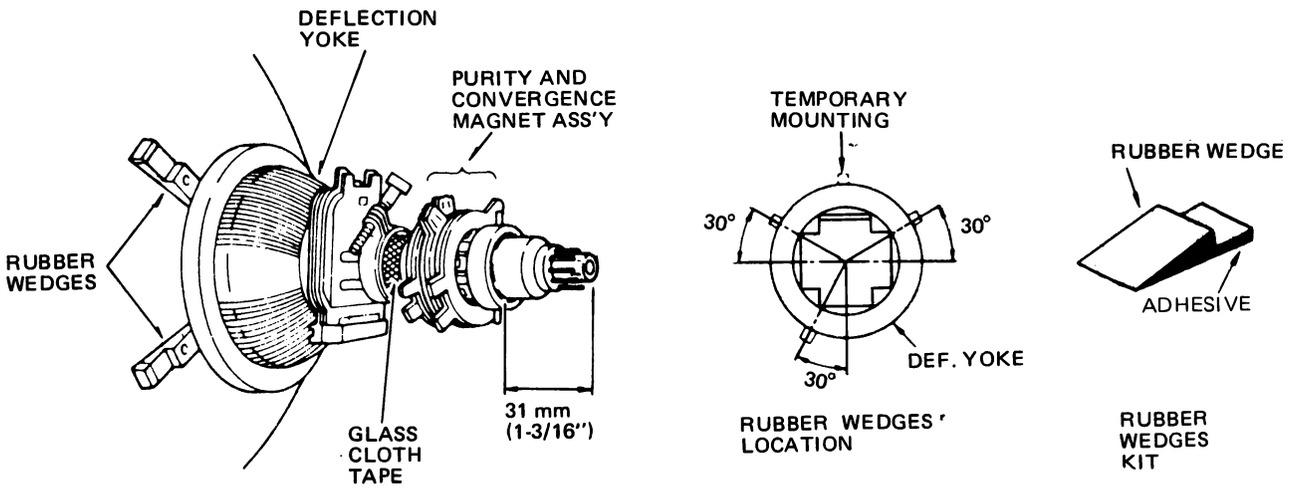
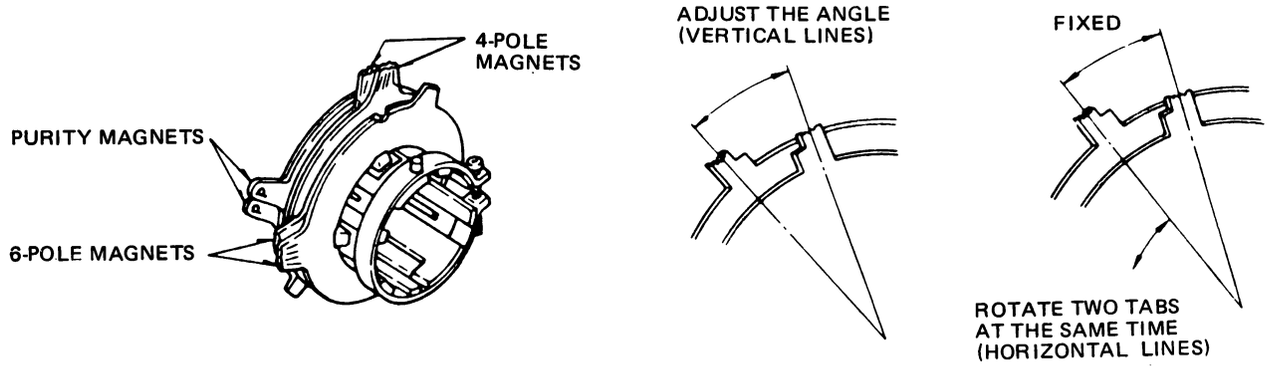


Figure. 20



CONVERGENCE MAGNET ASSEMBLY

ADJUSTMENT OF MAGNETS

Figure. 21.

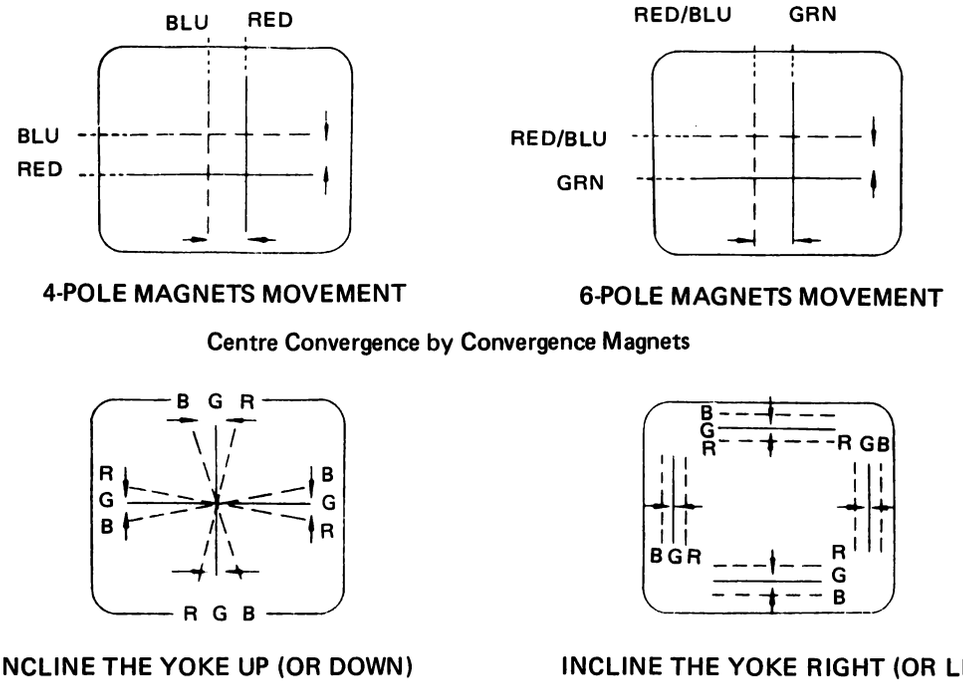


Figure 22. Dot Movement Pattern

9. GENERAL ALIGNMENT INSTRUCTIONS

9-A. GENERAL

Alignment is an exacting procedure and should be undertaken only when necessary.

The test equipment specified or its equivalent is required to properly perform the alignment procedures which are outlined on the following pages. Use of equipment which does not meet these requirements may result in the inability to properly align the receiver.

It is essential that bias values as specified are maintained during alignment to insure proper results.

9-B. EQUIPMENT TERMINATIONS

Alignment pads are designed for correct matching of the equipment to the circuits involved. Failure to the proper matching will result in responses which cannot be depended upon as representing the true operation of the receiver. The pads should be constructed as compactly as possible with all unshielded leads in excess of 2.5 cm long.

9-C. SIGNAL OVERLOAD

Use of excessive signal from the sweep generator can cause overloading of receiver circuits. To determine that this condition is not present and that the response curve is true, turn the sweep generator output to zero and then gradually increase the output until a response is obtained. Further increase of the sweep output should not change the configuration of the response except in amplitude. If the response changes in configuration, just as flattening at the top or dropping below the base line at the bottom, decrease the sweep output to restore the proper configuration. The oscilloscope gain should be as high as possible to maintain a useable pattern with the peak-to-peak values specified, thus requiring a lower output from the sweep generator and less chance of overload.

Insertion of markers from the marker generator should not cause distortion of the response.

9-D. TEST EQUIPMENTS

OSCILLOSCOPE (WIDE BAND)
COLOUR-BAR/DOT/CROSSHATCH GENERATOR
TV SWEEP MARKER ALIGNMENT GENERATOR
VACUUM TUBE VOLTMETER
VIDEO DETECTOR BLOCK
VOLT-OHM MILLIAMMETER
MARKER GENERATOR
AGC BIAS SUPPLY
DIRECT LOW CAPACITY PROBE
SOUND SIGNAL GENERATOR
VIDEO SWEEP GENERATOR
MATCHING PAD
DEGAUSSING COIL – Demagnetized picture tube and chassis.
MICROSCOPE – Microscope of approximately 12 power for phosphor dot observation in the colour picture tube.

9.1 MAGNIFIED RESPONSE ALIGNMENT

GENERAL . . . . . Refer to figure 23 and 25 for test equipment connection and alignment points.

PRELIMINARY STEPS . . . . . 1. Connect the horizontal output of sweep/marker generator to the horizontal input of monitor scope.
2. Set the monitor scope gain for 0.1V/Cm.
3. Connect the output of sweep/marker generator in series with matching pad to Test Point on the tuner through 10K ohm resistor. (Fig. 24)
4. Connect the monitor scope with direct probe to terminal TP-12 on main board.
5. Apply +16.5 Volts bias to terminal pin 9 on main board.
6. Apply +8 Volts bias to terminal TP-14 on main board through 220 ohm resistor.
7. Gradually increase (or decrease) the output of sweep/marker generator to obtain a 1.0 Vp-p response curve on the scope.
8. If necessary adjust sweep center and sweep width control for proper location curve on the scope.

CONNECTION

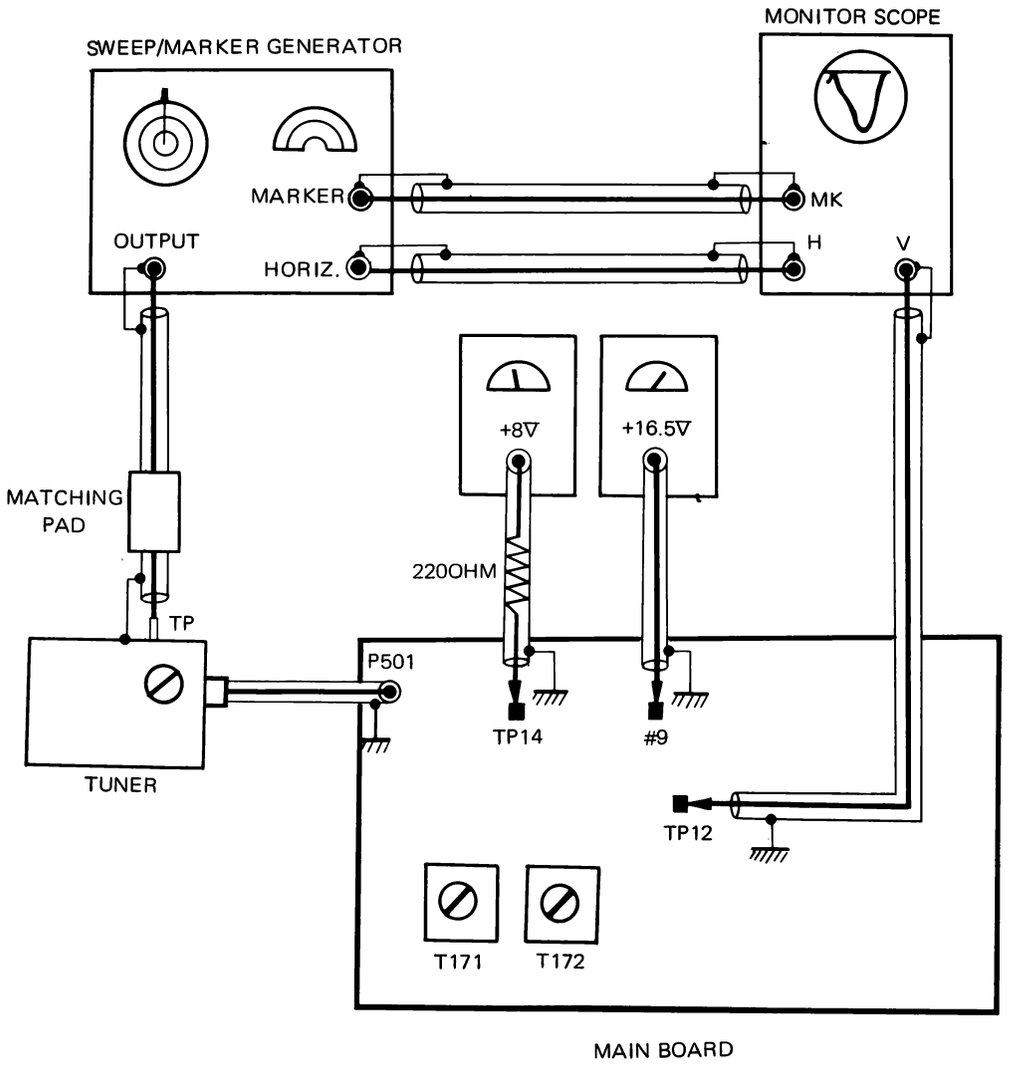


Figure 23. Magnified Response Alignment

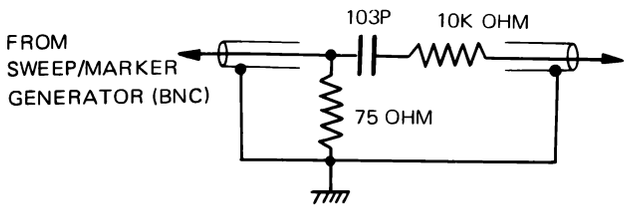


Figure 24. MATCHING PAD

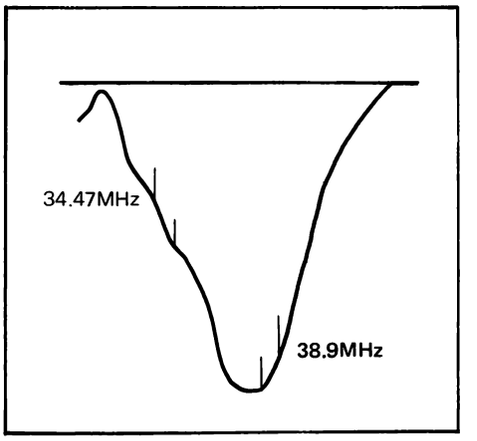


Figure 25. Magnified Response Curve

STEP	SWEMAR GENERATOR	ADJUST	REMARKS
38.9MHz	Increase (or decrease) the output to obtain a 1.0Vp-p response curve on the scope	T171	Adjust the video detector coil(T171) for maximum display at 38.9MHz on the scope (Fig. 25)

9.2 OVERALL RESPONSE ALIGNMENT

GENERAL ..... Refer to figures 26 and 27 for test equipment connection and alignment point.

PRELIMINARY STEPS .....

1. Connect the horizontal output of sweep/marker generator to the horizontal input of monitor scope.
2. Set the monitor scope gain for 0.1V/Cm.
3. Connect the output of sweep/marker generator in series with matching pad to test point on the tuner through 10K ohm resistor. (Fig. 24)
4. Connect the monitor scope with direct probe to TP-12 on main board.
5. Connect the damping resistor(100 ohm) between T1 and T2 (pin 8, 9 of IC101) on main board.
6. Apply +16.5 Volts bias to pin 9 on main board.
7. Apply +8 Volts bias to TP-14 on main board through 220 ohm resistor.
8. Gradually increase (or decrease) the output of sweep/marker generator to obtain a 1.0 Vp-p response curve on the scope.

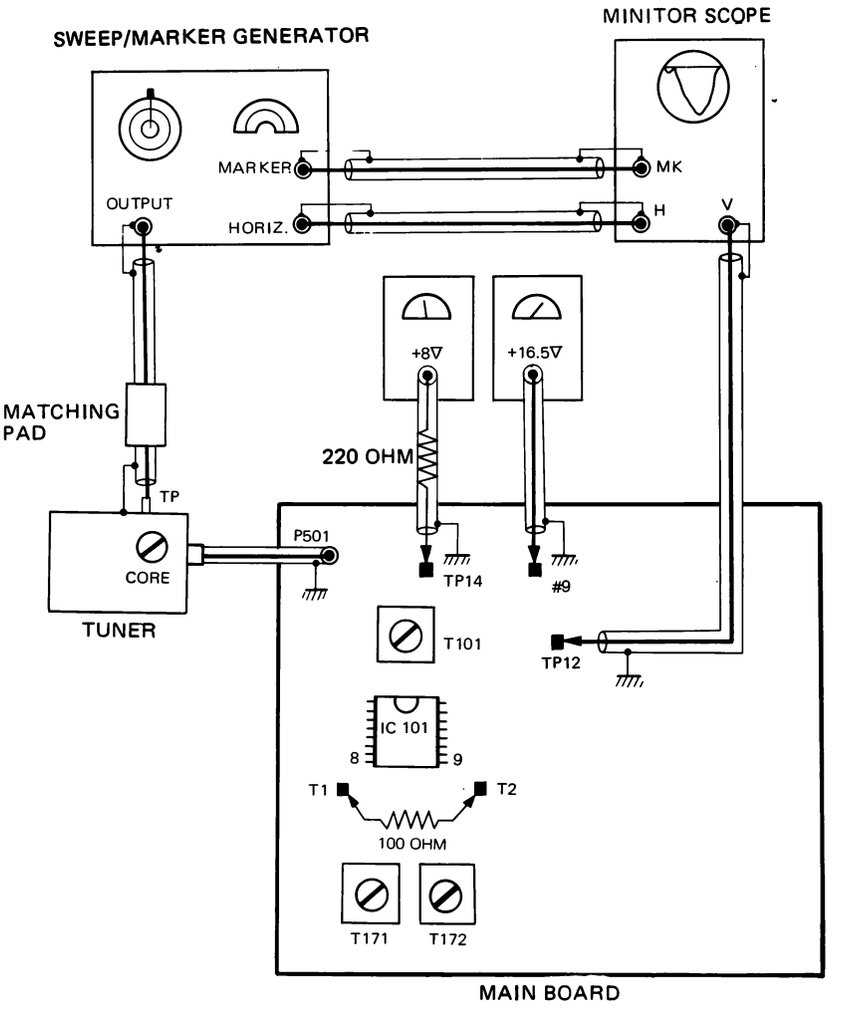


Figure 26. Overall Response Alignment

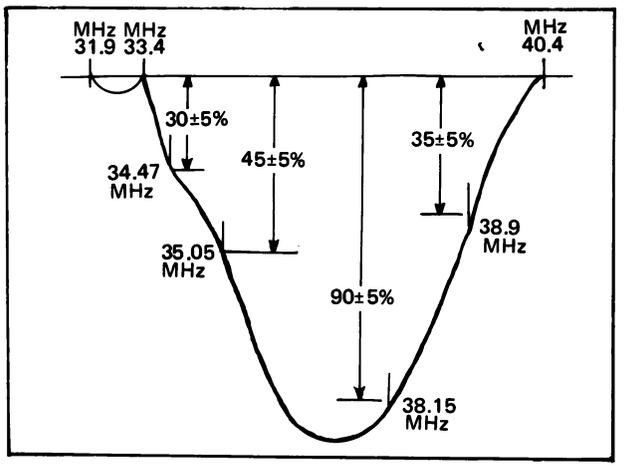


Figure 27. Overall Response Curve

STEP	SWEMAR GENERATOR	ADJUST	REMARKS
OVERALL	Set the output of swemar generator to obtain a 1.0 Vp-p response curve on scope.	(1) T101 (2) Converter core of the tuner	Alternately adjust T101 and converter core on the tuner for response shown in Figure 27.

9.3 CHROMA TRAP AND VIDEO TRAP ALIGNMENT (ON MAIN BOARD)

PREPARATION .....
1. Set the monitor scope gain to maximum position.
2. Set the output of sweep generator to maximum position.
3. Set the contrast control to maximum position.
4. Connect the output of sweep/marker generator with matching pad to test point on the tuner (Figure 24)
5. Connect the monitor scope with detector probe to base lead of Q203. (Figure 28)
6. Apply +16.5 Volts bias to pin 9 on main board.

STEP .....
1. Adjust chroma trap(T202) for minimum display at 4.43 MHz on the scope. (Figure 29)
2. Adjust sound trap(T201) for minimum display at 5.5 MHz on the scope. (Figure 29)

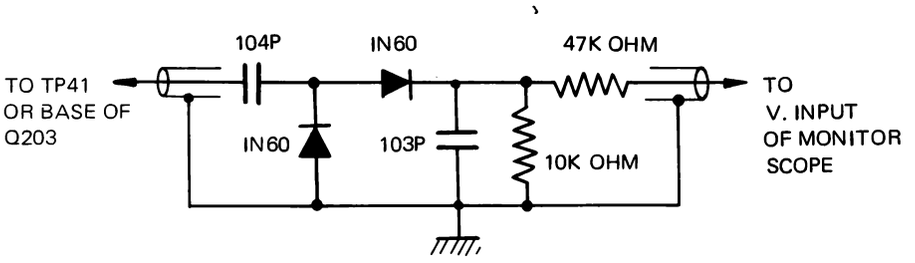


Figure 28. Detector Probe

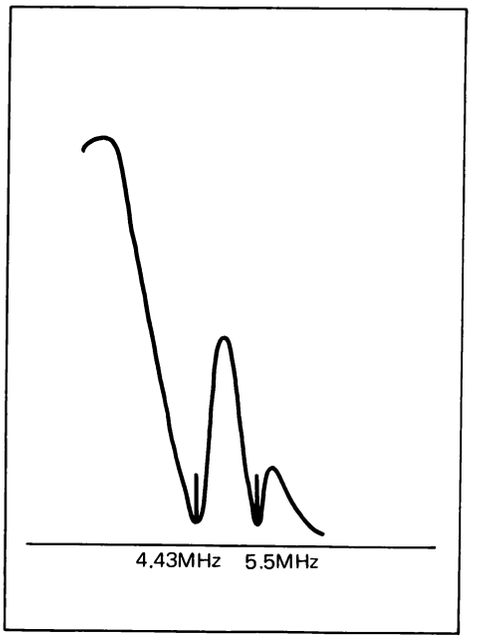


Figure 29.

9.4 CHROMA/SOUND TRAP ADJUSTMENT (ON CHROMA BOARD)

PREPARATION .....
1. Set the monitor scope gain to maximum position.
2. Set the output of sweep generator to maximum position.
3. Set the contrast control to maximum position.
4. Connect the output of sweep generator with matching pad to test point on the tuner (Fig. 24)
5. Connect the monitor scope with detector probe to TP-41 on chroma board. (Fig. 28)
6. Apply +16.5 Volts bias to pin 9 on main board.

STEP ..... Adjust sound trap(T502) for minimum display at 5.5 MHz on the scope. (Fig. 30)

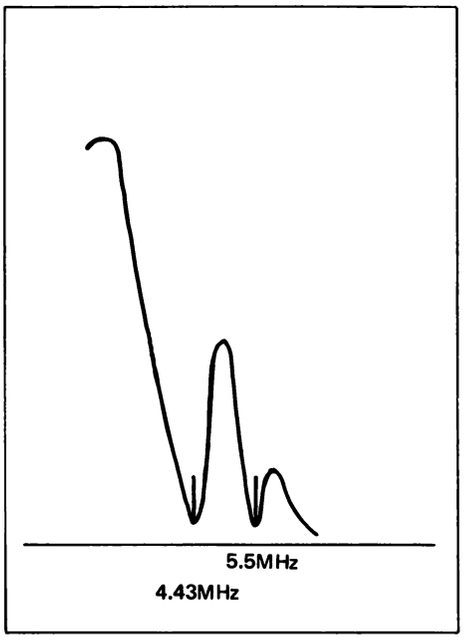


Figure 30.

9.5 AFT ALIGNMENT

PRELIMINARY STEP . . . . . 1. Unplug the socket of CN01 on main board except the terminal pin 46 so as to apply +16.5 Volts bias to the tuner.
2. Connect a digital voltmeter between terminal 42(+lead) and terminal 43(-) on main board.
3. Set AFT Switch to ON position.
4. Apply +8 Volts bias to terminal TP-14 on main board.
5. Apply +16.5 Volts bias to terminal pin 9 on main board.

STEP (1) . . . . . 1. Adjust the AFT BALANCE ADJ(VR152) on main board for zero volt on digital voltmeter.
2. Disconnect a digital voltmeter between terminal 42 and terminal 43 on main board.

STEP (2) . . . . . 1. Connect the output of sweep/marker generator in series with matching pad to test point on the tuner through 10K ohm resistor. (Refer to Fig. 24)
2. Connect the monitor scope with direct probe to terminal pin 42 on main board.
3. Set the monitor scope gain for 0.2V/Cm.
4. Gradually increase (or decrease) the A.G.C bias to obtain 2 Vp-p response on the scope.
5. Adjust T172 for response shown in Figure 31.

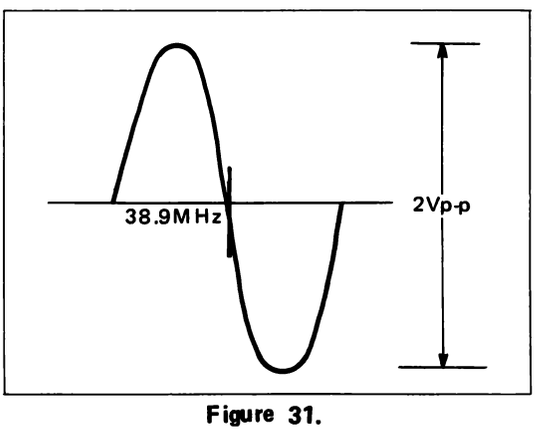


Figure 31.

* STEP (1) DOESN'T NEED IN 507Z SERIES.

9.6. SOUND IF DETECTOR COIL ALIGNMENT

GENERAL . . . . . .Refer to figure 32 and 33 for test equipment connection and alignment points.

PRELIMINARY STEPS . . . . . 1. Connect pin 51 to chassis ground with short JUMPER wire.
2. Connect the output of 5.5MHz GENERATOR with direct probe to terminal TP-21 on main board.
3. Connect the Oscilloscope with direct probe to M on main board.
4. Apply +12 Volts bias to the lead of R603. (pin 5 of IC601)
5. Set the Oscilloscope gain for 0.1V/Cm. And adjust sweep output for easy alignment.

CONNECTION

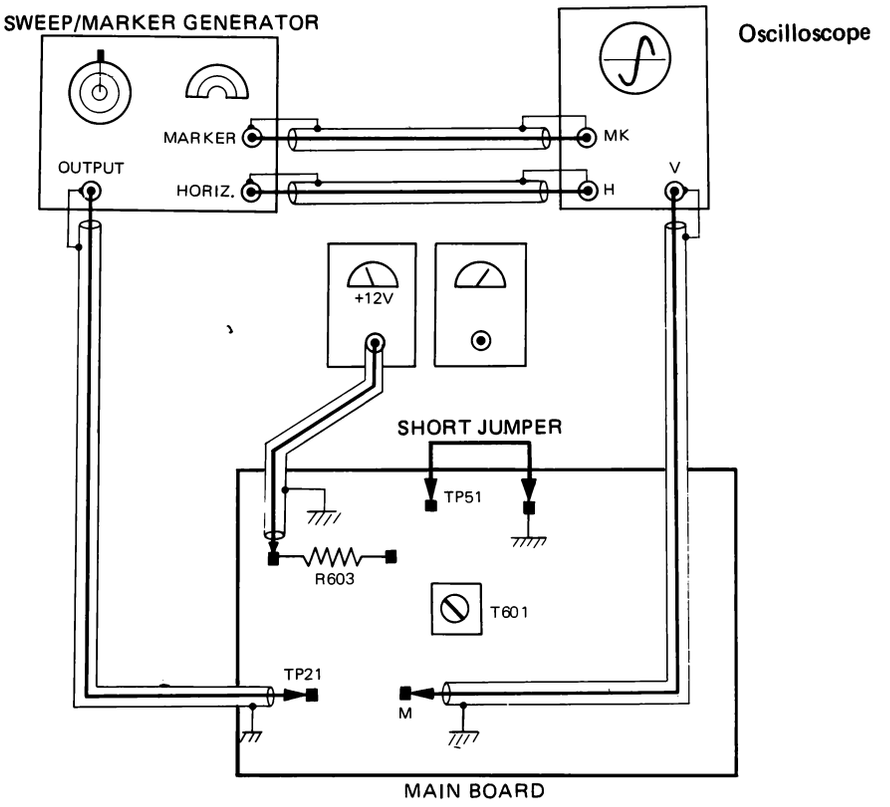


Figure 32. Sound IF DET. Coil Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
SIF DET	Set the output of 5.5MHz GENERATOR to maximum position	T601	Adjust SIF DET coil(T601) so that the 5.5 MHz marker is just on reference level line (Refer to Fig. 33)

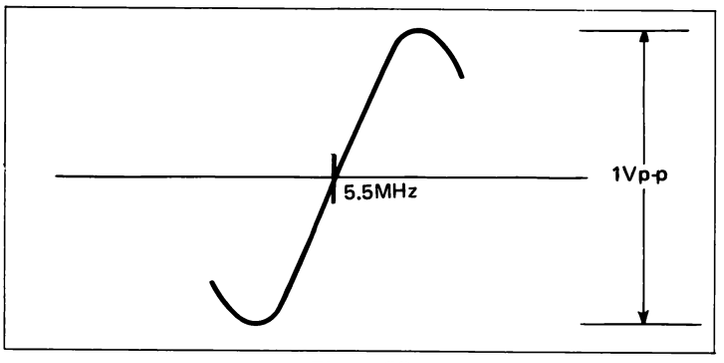


Figure 33.

9.7 PAL MATRIX ADJUSTMENT

EQUIPMENTS
1. Color bar pattern generator.
2. Variable voltage controller 0~300V, AC

PREPARATIONS
1. Check that the power A.C line is normal (220V or 110/240V, 50/60Hz)
2. Connect A.C line and the power A.C switch sets in "ON" position.
3. Receive a HUE pattern with a color bar pattern generator.
4. Set the color and contrast controls to maximum position.
5. Adjust the brightness control for well defined scan lines.

STEPS
1. Adjust the DL ADJ control (VR551) to minimize the Venetian Blind.
2. Adjust the DL phase ADJ(T501) to minimize the Venetian Blind.
3. If the Venetian Blind appears, adjust the color sync adjustment again and then repeat adjustment above 1 and 2.

9.8 PAL COLOR SYNC ADJUSTMENT

PREPARATION
1. Check that the power A.C line is normal. (220V or 110/240V, 50/60Hz)
2. Connect A.C line and the power A.C switch sets in "ON" position.
3. Receive a color bar pattern with a color bar signal generator.

STEPS
1. Connect terminal TP43 on chroma board to chassis ground with a short jumper wire.
2. Connect the 21th pin of IC501 on chroma board to ground(Y) through 10K ohm resistor so that the color killer turns off.
3. Adjust 4.43 MHz free run ADJ. control(VR552) on chroma board so that the color bar pattern stands vertically.
4. Remove the short jumper wire and 10K ohm resistor.
5. Check that the color appears within 0.5 sec when changing the channel to another.

9.9 SECAM COLOUR ALIGNMENT

PREPARATIONS
1. Setting the trigger mode of the Oscilloscope to EXT. mode, hold the sync using the induced horizontal voltage.
2. Set the Time division of the scope to 20 uS/cm.
3. Set the Vert. Gain to 0.05V/cm.
4. Receive SECAM color pattern.
5. Push the AFT SW "ON."
6. Rotate the color, Brightness and Contrast control to maximum positions.

STEPS

1. Sound Trap Alignment
1. Short-circuit between L102 and TP-12 on main board with 10K ohm.
2. Connect the probe (10:1) of the scope to pin M7 on chroma board (ICM01 pin 25)
3. Adjust LM01 (Sound Trap) to minimize the 5.5 MHz beat Component. (Fig. 34)

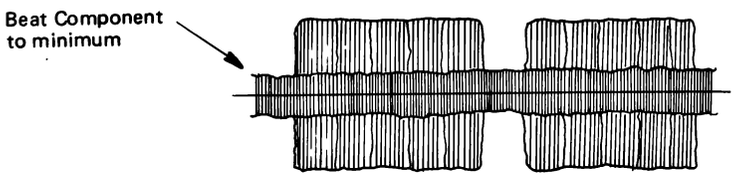


Fig. 34.

2. Bell Filter Alignment . . . . . 4. Remove the above 10K ohm resistor from T201.
5. Adjust LM02 so that each bar of (R-Y) and (B-Y) becomes even respectively. (Fig. 35)

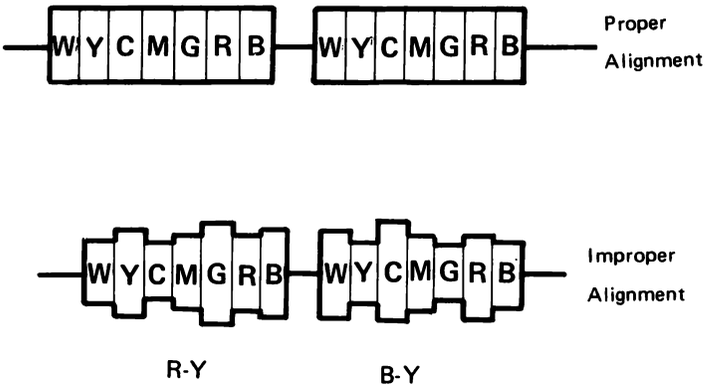


Figure 35.

3. SECAM Colour Killer Alignment . . . . . 6. Connect + lead of VTVM to TP-M3.
7. Adjust LM03 (Ident. Det. Coil) so that DC voltage is minimum.

4. SECAM Chroma DET. Coil Alignment . . . . . 8. Connect the Oscilloscope to pin R1 of 3P connector.
9. Adjust LM06 (R-Y Demod, coil) so that non colour part and horizontal blanking part are on the same level.
10. Further, change connection of scope from R1 to B3 and adjust LM07 (B-Y Demod, coil) the same as above. (Figure 36, 37)

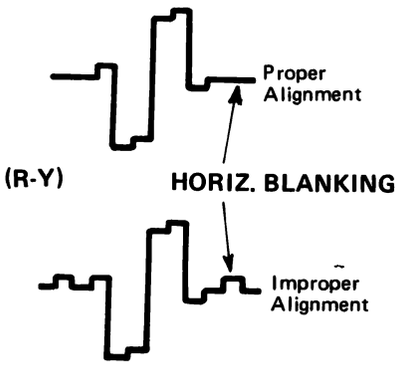


Fig. 36.

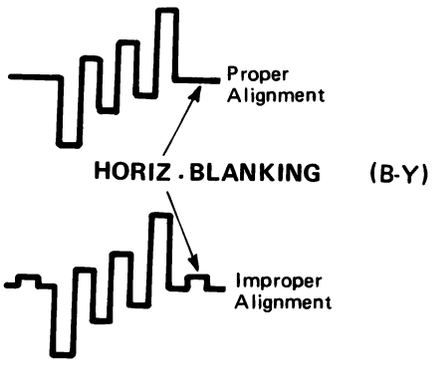
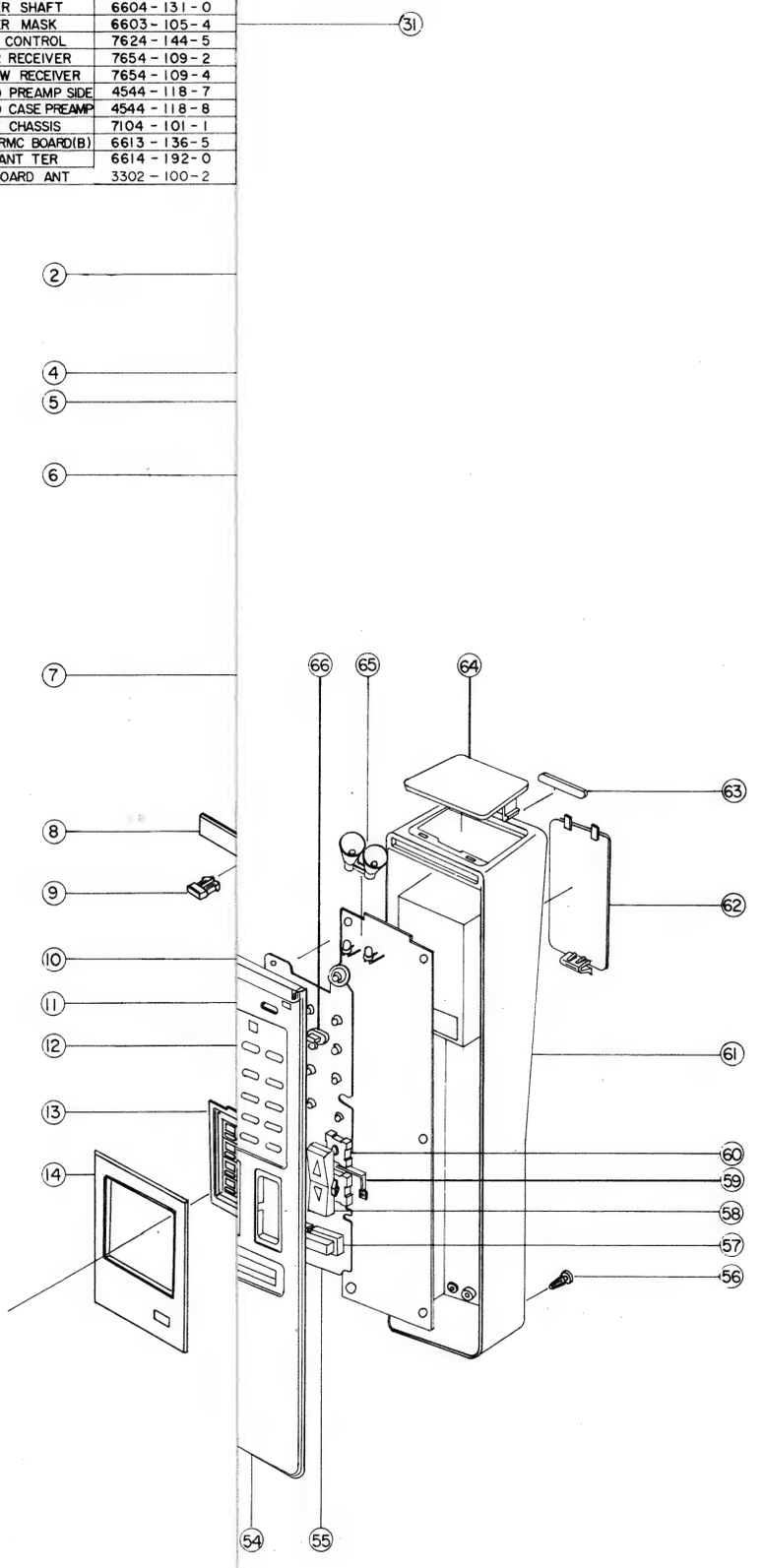


Fig. 37.

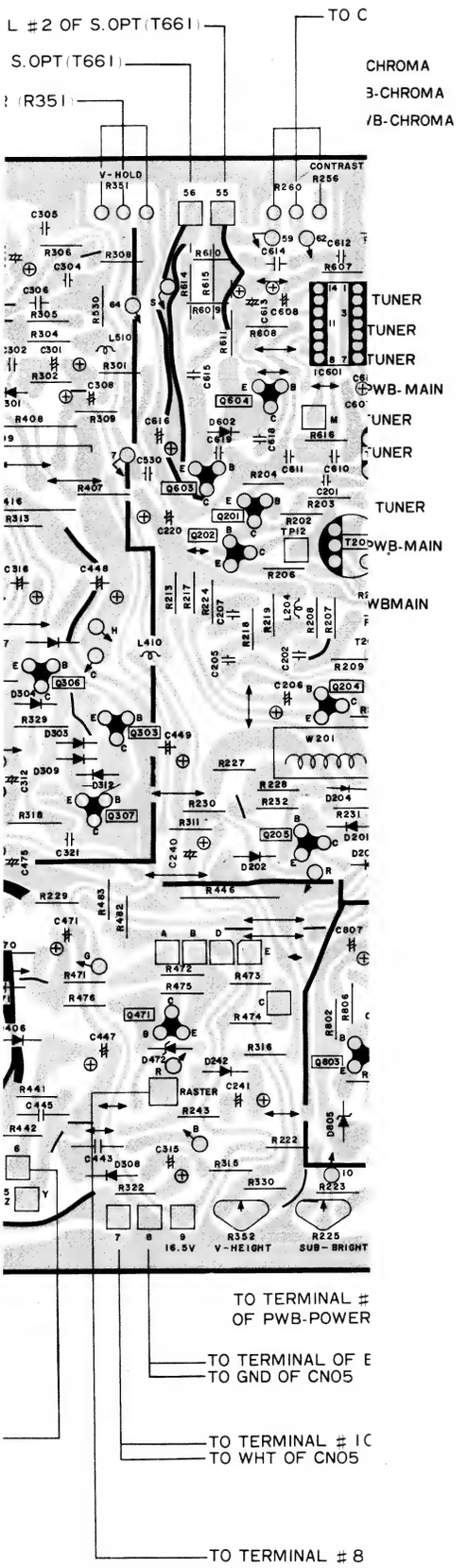
5. Sub-Colour Alignment . . . . . 11. Set the Colour control (R555) to maximum.
12. Connect Oscilloscope to B3 of 3P Connector on chroma module.
13. Adjust colour control (RM53) to set the (B-Y) output to 3.6 Vp-p.

NO	NAME of PARTS	CODE NO
1	INLAY CDS	7714 - 183 - 3
2	BRKT CDS	6614 - 196 - 4
3	BRKT POWER	6613 - 137 - 2
4	HANDEL CABINET	7662 - 100 - 9
5	KNOB VR	7624 - 144 - 4
6	CABINET ASSY	6101 - 103 - 9
7	MASK FRONT	6001 - 190 - 0
8	DOOR BOTTOM	6053 - 105 - 1
9	HANDLE DOOR	7664 - 103 - 3
10	HINGE DOOR	6604 - 130 - 5
11	TRAME FILM	8013 - 105 - 0
12	DOOR CONTROL	6052 - 102 - 4
13	WINDOW CONTROL	7653 - 103 - 8
14	INLAY DOOR	7713 - 133 - 5
15	LOCK HANDLE	8344 - 102 - 7
16	LOCK BASE	8344 - 102 - 6
17	BADGE BRAND	8024 - 132 - 0
18	HOLDER LEG	6604 - 130 - 9
19	BRKT POWER	6614 - 190 - 9
20	HOLDER SHAFT	6604 - 131 - 0
21	HOLDER MASK	6603 - 105 - 4
22	KNOB CONTROL	7624 - 144 - 5
23	COVER RECEIVER	7654 - 109 - 2
24	WINDOW RECEIVER	7654 - 109 - 4
25	SHIELD PREAMP SIDE	4544 - 118 - 7
26	SHIELD CASE PREAMP	4544 - 118 - 8
27	SCREW CHASSIS	7104 - 101 - 1
28	BRKT RMC BOARD(B)	6613 - 136 - 5
29	BRKT ANT TER	6614 - 192 - 0
30	TER BOARD ANT	3302 - 100 - 2

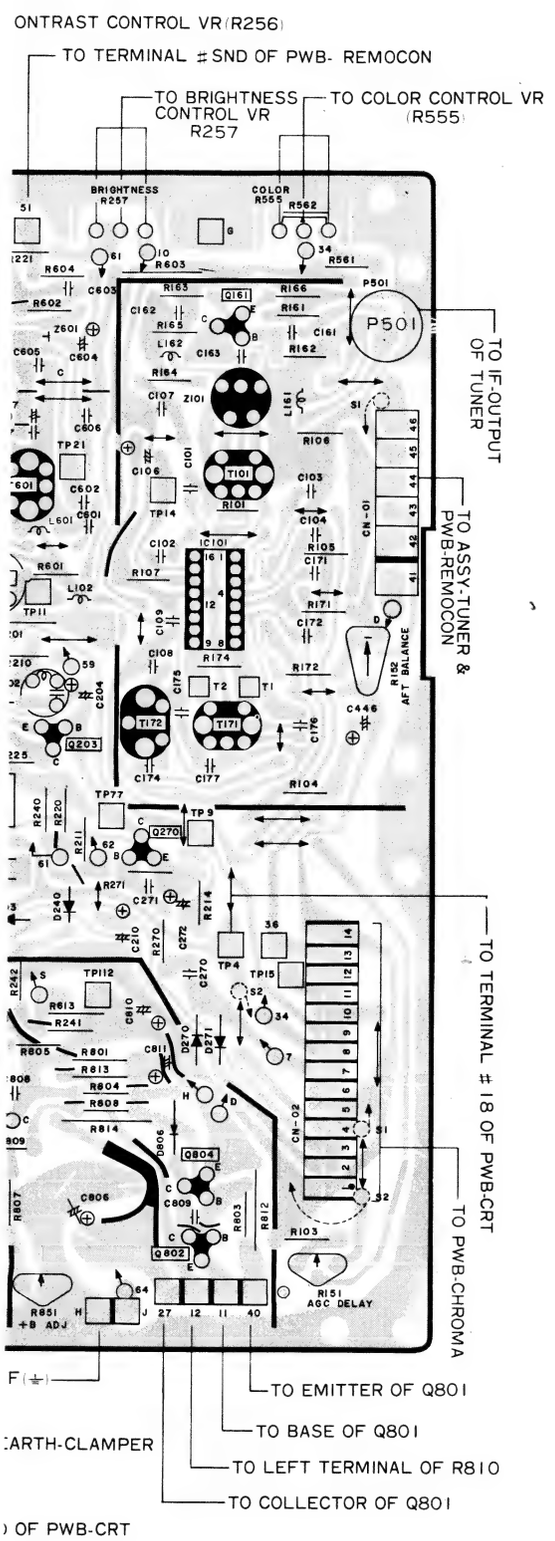


1. BOTTOM VIEW OF PWE

PWB-MAIN (3002-0
(COPPER SIDE)

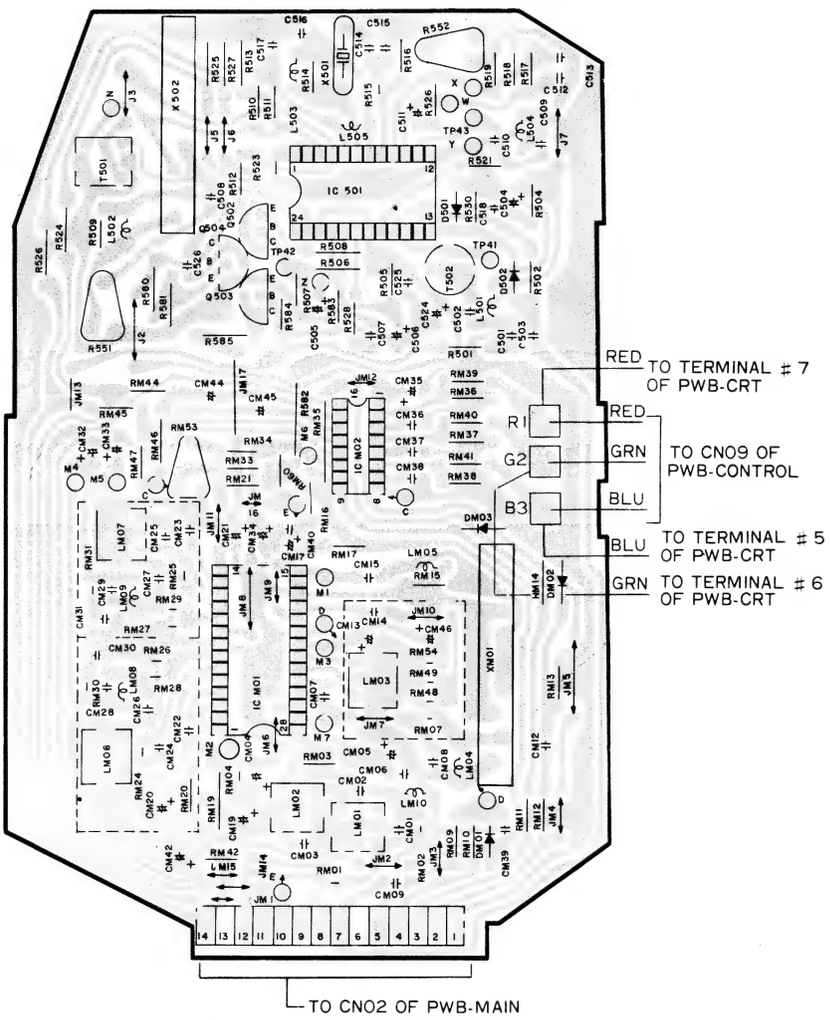


33-010)



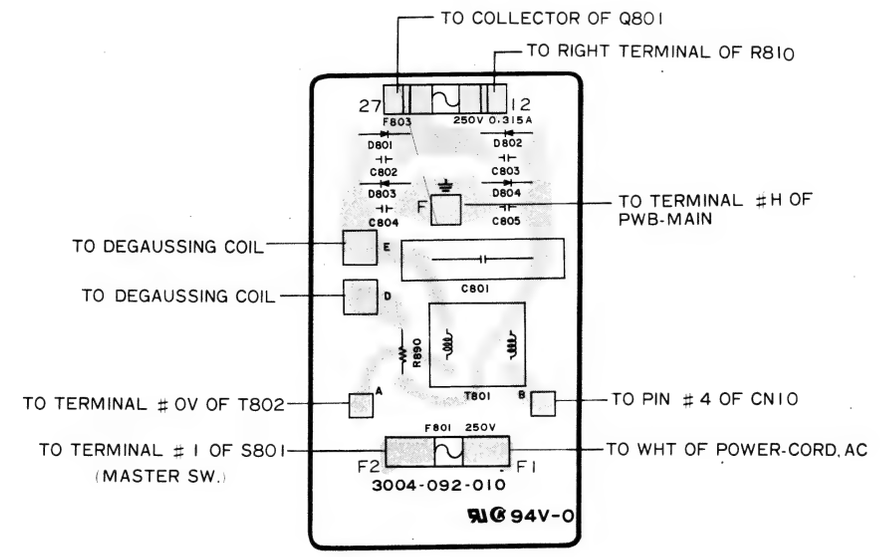
② PWB-CHROMA(3004-024-910)

(COPPER SIDE)



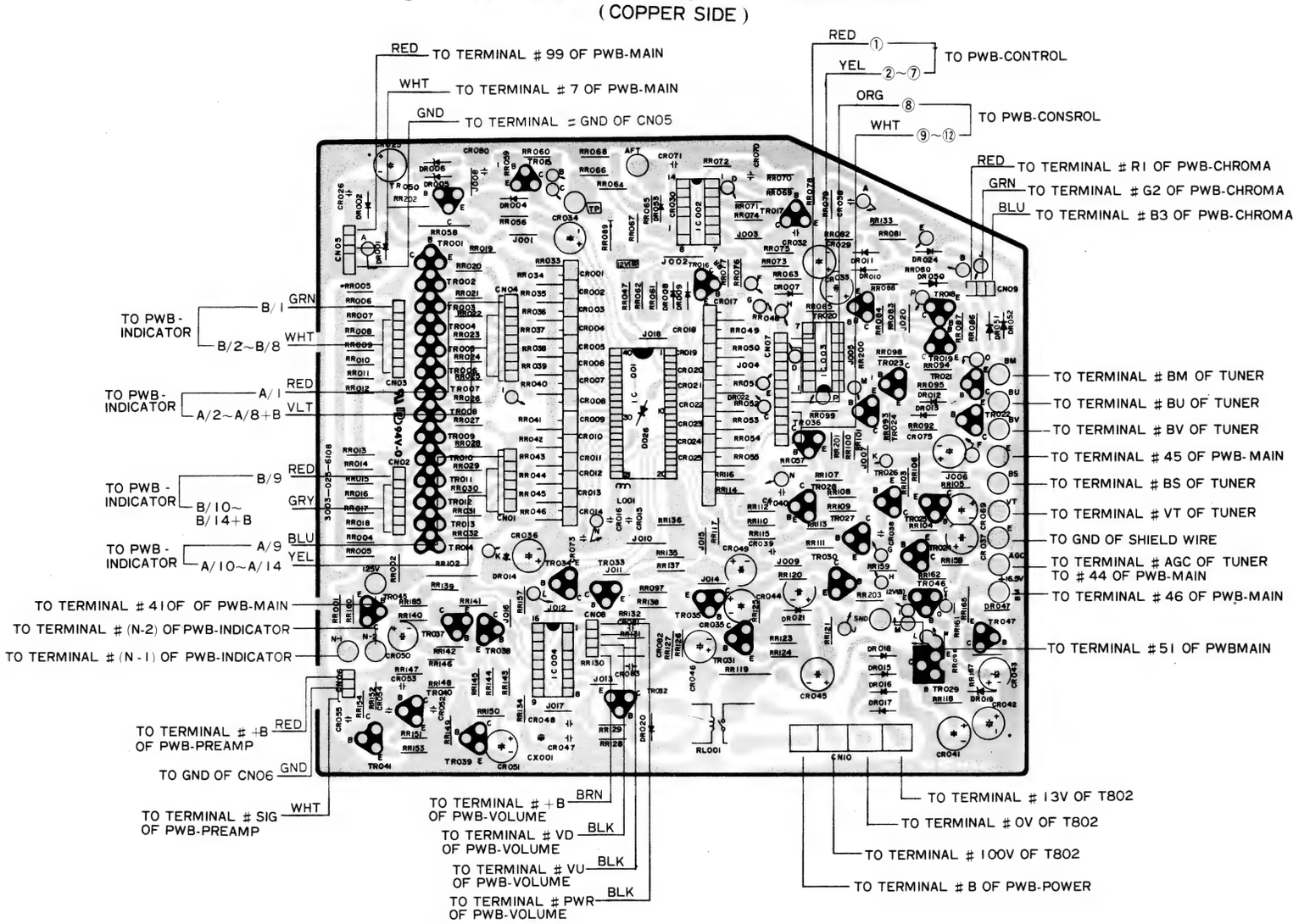
③ PWB-POWER (3004-092-010)

(COPPER SIDE)



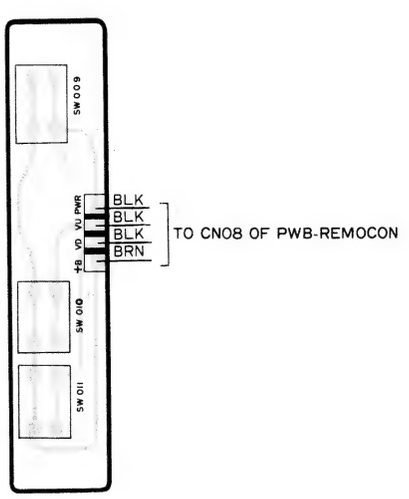
④ PWB-REMOCON(3003-025-610)

(COPPER SIDE)



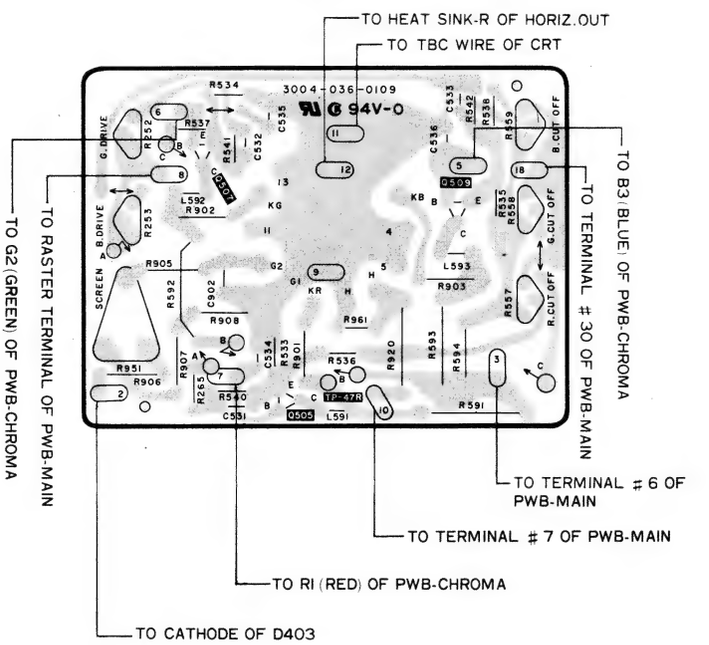
⑤ PWB-VOLUME(3004-092-110)

(COPPER SIDE)



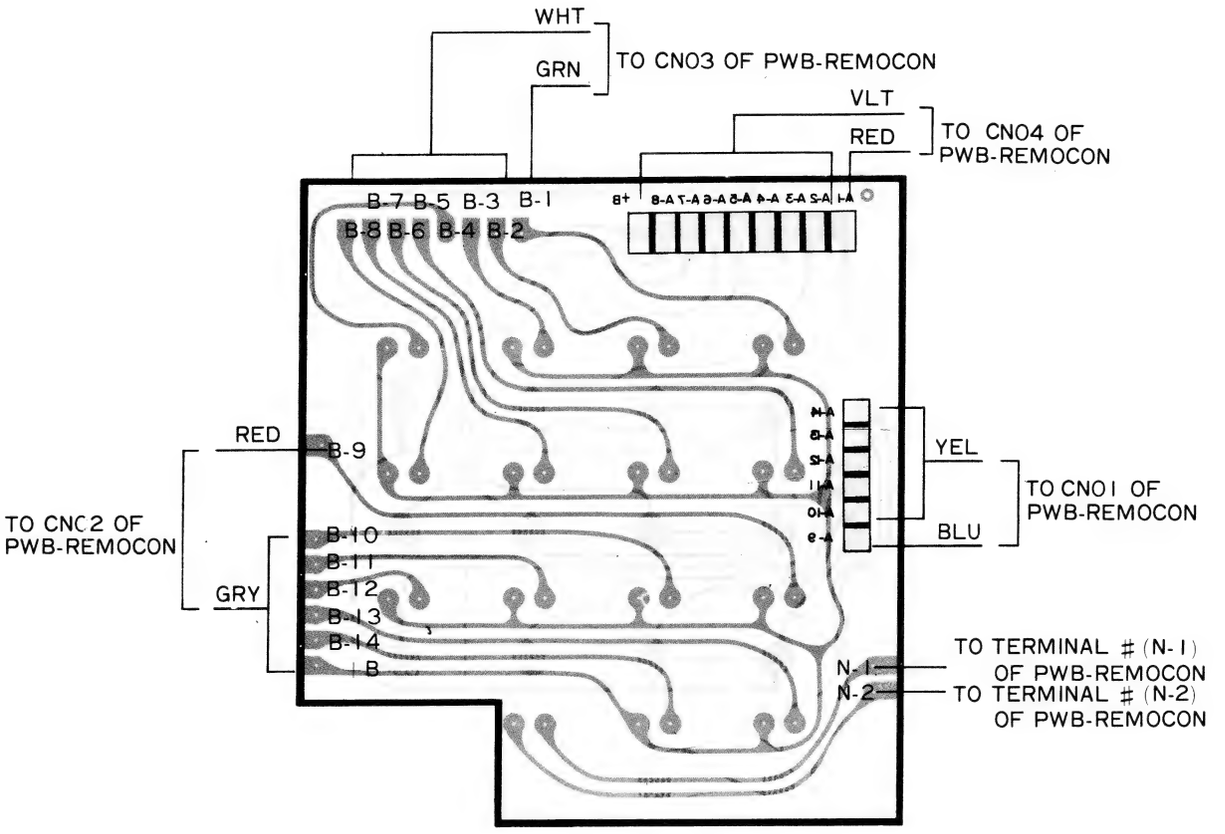
⑥ PWB-CRT(3004-036-010)

(COPPER SIDE)



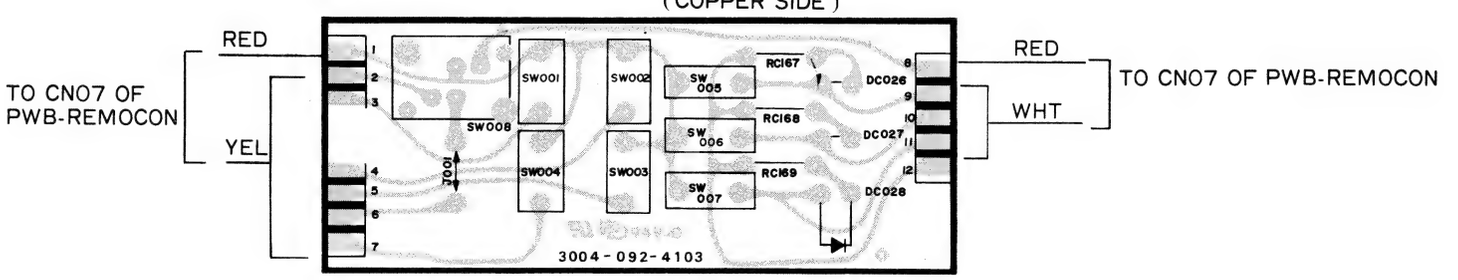
⑦ PWB-INDICATOR(3004-092-310)

(COPPER SIDE)



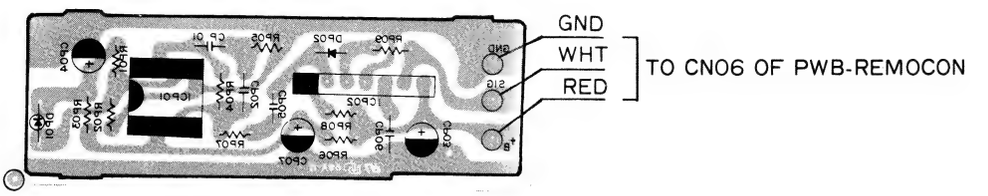
⑧ PWB-CONTROL(3004-092-410)

(COPPER SIDE)



⑨ PWB-PREAMP (3004-092-210)

(COPPER SIDE)



12. CHASSIS PARTS LIST

ABBREVIATIONS: Capacitors·····CD: Ceramic Disk PF: Plastic Film, EL: Electrolytic
Resistors·····CF: Carbon Film, CC: Carbon Composition, MF: Metal Film,
OMF: Oxide Metal Film, VR: Variable Resistor FR: Fusible Resistor

Schematic Location	Part No.	Description
	MAIN BOARD	
	3002-033-010	PWB-MAIN
CAPACITORS		
C101 C103		
C104 C108		
C109 C161		
C162 C163	1419-109-1400	CD 50V 0.01M-Z
C409 C603		
C605 C606		
C809		
C102 C171		
C172 C612	1419-109-1002	CD 50V 1000-Z
C106	1629-201-4702	C-Tantal 50V 0.47M-K
C107	1609-402-0703	EL 35V 22M
C174	1409-101-1605	CD 50V 15-J
C175 C176	1409-101-8309	CD 50V 2-C
C177	1409-101-8105	CD 50V 1-C
C201	1409-101-1906	CD 50V 20-J
C202	1409-101-5508	CD 50V 240-K
C204 C617	1609-402-2208	EL 50V 2.2M
C205	1409-101-4503	CD 50V 27K
C240 C272		
C301 C308	1609-402-2208	EL 50V 1M
C404 C406		
C613 C206		
C207	1409-101-4600	CD 50V 270-J
C210 C610	1609-401-4700	EL 16V 100M
C220	1609-401-7006	EL 25V 330M
C241 C315	1609-402-2509	EL 50V 10M
C270	1419-104-4002	CD 50V 1000-K
C271	1419-104-2400	CD 50V 390-K
C302	1509-121-4702	PF 100V 0.01M-K
C303	1419-104-2507	CD 50V 470-K
C304	1509-125-1806	PF 200V 0.024M-J
C305	1509-121-1503	PF 100V 0.015M-J
C306	1509-121-3008	PF 100V 0.22M-J
C307	1419-104-2808	CD 50V 3900-K
C317 C309	1629-201-4906	C-Tantal 50V 2.2M-K
C310 C608		
C402	1609-402-2004	EL 50V 0.47M
C311	1609-402-2907	EL 50V 100M
C312	1609-402-0606	EL 35V 10M
C313	1609-403-2007	EL 160V 4.7M
C314	1509-125-1709	PF 200V 0.02M-J
C316	1609-402-3009	EL 50V 220M
C318	1419-106-1906	CD 500V 3300-K
C319	1609-402-2800	EL 50V 47M
C321	1419-106-5605	CD 500V 4700-P

Schematic Location	Part No.	Description
C401	1509-121-1309	PF 100V 0.0082M-J
C403	1509-121-1105	PF 100V 0.0056M-J
C405	1509-452-2307	PF 50V 3600-J
C407	1419-104-4701	CD 50V 1000-M
C408 C810 C807 C811	1609-403-1905	EL 160V 3.3M
C411 C530	1419-104-2002	CD 500V 1500-K
C413	1419-106-1702	CD 500V 2200-K
C414	1509-335-0402	PF 200V 0.047M-J
C415	1419-106-0804	CD 500V 390-K
C416	1419-106-1100	CD 500V 680-K
C430	1419-106-0202	CD 500V 220-K
C440	1509-391-0503	PF 1600V 0.01M-J
C442	1509-335-1902	PF 200V 0.43M-J
C445	1509-335-0509	PF 200V 0.056M-J
C446	1609-401-4904	EL 16V 330M
C447	1609-403-4900	EL 250V 10M
C448	1609-403-2308	EL 160V 33M
C449	1609-401-7200	EL 25V 1000M
C471	1609-403-5808	EL 315V 2.2M
C475	1609-401-2700	EL 16V 47M
C601 C602	1409-101-2707	CD 50V 47-J
C607	1509-121-1406	PF 100V 0.01M-J
C610	1409-103-3106	CD 50V 68-J
C611	1409-107-0802	CD 50V 10-C
C614	1509-125-5602	PF 200V 0.039M-K
C615	1609-803-9309	EL 250V 2.2M(NP)
C616	1609-403-2201	EL 160V 22M
C618 C619	1419-106-1304	CD 500V 1000-K
C666	1609-401-4603	EL 16V 47M
C806	1619-007-0309	EL 160V 470M
C808	1419-106-5702	CD 500V 0.01M-P
RESISTORS		
R101	1018-227-1822	CF 1/4W 1.8K-J
R103 R162 R243 R320 R601 R602 R603	1018-227-1026	CF 1/4W 1K-J
R104,R271 R308	1018-227-3938	CF 1/4W 39K-J
R105 R164 R217 R604	1018-227-2216	CF 1/4W 220-J
R106 R240	1018-227-1044	CF 1/4W 100K-J
R107	1018-227-8243	CF 1/4W 820K-J
R151 R255	1242-110-0047	VR-SEMI B-type 5K R151 AGC Delay R255 SUB BRIGHT

Schematic Location	Part No.	Description
R152	1018-227-1840	CF 1/4W 180K-J
R161 R202 R209 R232	1018-227-1017	CF 1/4W 100-J
R163 R321	1018-227-5628	CF 1/4W 5.6K-J
R165 R301 R270	1018-227-4711	CF 1/4W 470-J
R166	1018-227-2702	CF 1/4W 27-J
R171	1018-227-1220	CF 1/4W 1.2K-J
R174 R214 R307	1018-227-3929	CF 1/4W 3.9K-J
R201 R607	1018-227-2225	CF 1/4W 2.2K-J
R203	1018-227-4720	CF 1/4W 4.7K-J
R204 R213 R331	1018-227-2720	CF 1/4W 2.7K-J
R206 R225 R227	1018-227-1628	CF 1/4W 1.6K-J
R207	1018-227-8216	CF 1/4W 820-J
R208 R219	1018-227-3318	CF 1/4W 330-J
R210 R231	1018-227-6809	CF 1/4W 68-J
R211	1018-227-3044	CF 1/4W 300K-J
R220 R316	1018-227-3327	CF 1/4W 3.3K-J
R218	1018-227-3910	CF 1/4W 390-J
R221 R242 R609 R610	1018-227-8234	CF 1/4W 82K-J
R222	1081-227-1239	CF 1/4W 12K-J
R223 R311	1018-227-6836	CF 1/4W 68K-J
R224	1018-227-1512	CF 1/4W 150-J
R228 R322	1018-227-2410	CF 1/4W 240-J
R229 R403 R404	1018-227-3628	CF 1/4W 3.6K-J
R230	1049-313-2302	OMF 1W 680-J
R241 R314	1018-227-5637	CF 1/4W 56K-J
R303 R312	1018-227-5637	CF 1/4W 56K-J
R302	1018-227-5646	CF 1/4W 560K-J
R304 R530	1018-227-1327	CF 1/4W 1.3K-J
R305	1018-227-8225	CF 1/4W 8.2K-J
R306	1018-227-2429	CF 1/4W 2.4K-J
R309	1018-227-2447	CF 1/4W 240K-J
R310	1018-227-6845	CF 1/4W 680K-J
R313	1018-227-2438	CF 1/4W 24K-J
R315	1018-227-7521	CF 1/4W 7.5K-J
R317 R318	1018-327-1229	CF 1/2W 1.2K-J
R323	1049-901-0707	R-METAL, FILM 1W 2.7-J
R324	1049-313-2506	OMF 1W 820-J
R325	1018-327-1025	CF 1/2W 1K-J
R327 R470	1059-002-1000	R-Fusible 1/2W 10-J
R328	1049-101-0608	OMF 1W 10-J
R329 R444	1049-905-0505	R-Metal Film1/2W 1-J
R330	1018-227-1646	CF 1/4W 160K-J
R352	1242-110-0074	VR-semi B-type100K Vertical Height
R401	1018-227-5600	CF 1/4W 56-J
R402	1018-227-1831	CF 1/4W 18K-J

Schematic Location	Part No.	Description
R405	1018-227-3637	CF 1/4W 36K-J
R406	1018-226-1546	CF 1/4W 150K-G
R407	1018-327-3919	CF 1/2W 390-J
R408	1049-101-8705	OMF 1W 22K-J
R409	1049-317-1017	OMF 3W 10K-J
R410	1018-326-1536	CF 1/2W 15K-G
R411	1018-227-4304	CF 1/4W 43-J
R415	1028-328-2727	CC 1/2W 2.7K-K
R416	1049-907-0103	OMF 4W 2.7K-J
R428	1028-328-2204	CC 1/2W 22-K
R442 R483 R441	1018-227-1035	CF 1/4W 10K-J
R446	1049-317-1035	OMF 3W 33-J
R448	1059-003-0202	R-Fusible 1W 3.3-J
R451	1242-112-0052	VR-SEMI B-type 10K Horiz-Hold
R471 R472	1018-226-1546	CF 1/4W 150K-G
R473	1018-226-5625	CF 1/4W 5.6K-G
R474	1018-226-5111	CF 1/4W 510-G
R475 R561	1018-227-6827	CF 1/4W 6.8K-J
R476	1018-227-1053	CF 1/4W 1M-J
R482	1018-226-3333	CF 1/4W 33K-G
R603	1049-101-2219	OMF 1W 220-J
R611	1049-101-3807	OMF 1W 12K-J
R613	1059-002-0306	R-Fusible 1/2W 220-J
R614 R615	1049-101-4608	OMF 1W 2.2K-J
R616	1018-227-1530	CF 1/4W 15K-J
R666	1018-227-2012	CF 1/4W 200-J
R801	1018-327-3928	CF 1/2W 3.9K-J
R802	1028-328-2046	CC 1/2W 200K-K
R803	1018-227-1512	CF 1/4W 150-J
R804	1018-227-3619	CF 1/4W 360-J
R805 R806	1018-327-1830	CF 1/2W 1.8K-J
R807	1018-226-2222	CF 1/2W 15K-G
R808 R809	1018-227-2438	CF 1/4W 24K-J
R812	1049-901-1508	R-Metal Film 1W 0.56-J
R813	1018-327-4321	CF 1/2W 4.3K-J
R814	1049-101-9205	OMF 1W 20K-J
R851	1242-110-0108	VR-SEMI B-type 500 +112V Adjust

COILS & TRANSFORMERS

L102	2429-805-3300	Coil-Peaking 5.6μH
L161	2429-020-0106	Coil-Choke 0.5μH
L162	2429-020-0203	Coil-Choke 0.8μH
L204	2429-202-0603	Coil-Filter 15μH
L410	2429-014-0709	Coil-Choke 100μH
L405 L406	4049-004-0106	Core-Ferrite Bead 17.5mm
L407	2429-805-1106	Coil-Peaking 1μH
L411	2449-715-0103	Coil-Linearity 171mH
L510	2429-805-9805	Coil-Peaking 6800μH
L601	2429-805-4509	Coil-Peaking 12μH
T101	2719-044-0104	Trans-VIF
T171	2719-045-0107	Trans-VIF DET

Schematic Location	Part No.	Description
T172	2719-045-0107	Trans-AFT
T201	2709-611-0107	Trans-5.5MHz Trap
T202	2769-104-0104	Trans-4.43MHZ Trap
T304	2779-103-0203	Trans-Pincushion
T401	2849-007-0107	Trans-Horiz Drive
T461	2859-045-0100	Trans-Fly Back
		FS-51934
T601	2729-030-0106	TRANS-SIF
SEMICONDUCTORS		
IC101	2119-101-9408	IC TA7607AP
		PIF AFC
IC301	2119-101-1903	IC TA7609P(FA-2)
		Sync, Vert, Horiz
IC601	2109-103-2006	IC KA2101
		SIF, AUDIO
Q161	2139-301-0906	NPN Transistor 2SC388A
		Picture IF Amp
Q201 Q270	2139-302-7409	NPN Transistor KSC945-Y Q201:1st Video Amp Q270:Pedestal clamp
Q202	2139-302-7506	NPN Transistor KSC945-0
		2nd Video Amp
Q203 Q204	2139-103-3802	PNP Transistor KSA733-Y Q203: 3rd Video Amp Q204: 4th Video Amp
Q205	2139-103-4302	PNP Transistor KSA642-O
		5th Video Amp
Q303	2139-305-9301	NPN Transistor 2SC2229-O
		Vertical Drive
Q306	2139-302-8103	NPN Transistor 2SC2073
		Vertical Out put
Q307	2149-101-8505	PNP Transistor 2SA940
		Vertical Out put
Q402	2149-302-9103	NPN Transistor 2SC2068(FA-1
		Horizontal-Drive
Q603 Q604	2139-301-2304	NPN Transistor KSC 1507-O Sound Out put
Q803	2139-305-9301	NPN Transistor 2SC2229-O
		Error Amp
Q804	2139-304-5609	NPN Transistor 2SC2120-O
		Current Limiter
D201	2169-103-0307	Diode IS34(TV)
D202		Diode ISS55
D203 D204		D202, D203: Pulse clamper
D240 D242		D204: D304, D312: Protector.
D270 D271		D240: ABL Switch
D301 D303	2169-301-9207	D242: ABL
D304 D309		D270: Pulse clip
D310 D312		D271: Pulse Gate
D401 D402		D301, D310: clamper
D602		D303, D309: Bias
		D401: switch

Schematic Location	Part No.	Description
D302	2169-206-1106	Diode S5295G -43V Rect
D305		Diode IS2775 FA-1
D306	2169-202-2303	D305, D306: Boost up
D308		D308: clamper
D307	2169-202-2206	Diode IS1887 Protector
D216		Diode S5295G
D408	2169-206-1106	D406, : +180V Rectifier
D471		D408: 16.5V Rectifier
		D471: Fail Safe
D472 D805	2169-404-1807	Diode Zener 05Z6.2W D472: Fail Safe
		D805: STD Vtg
D806	2169-202-0701	Diode IS1886 Switching
Q471	2139-103-4001	NPN TRANSISTOR
		KSA733-O
MISCELLANEOUS		
Z101	4529-412-0102	Filter-PIF SAW F1024
W201	2469-003-0103	Delay-Line DL162501S
Z601	4529-317-0108	Filter-Ceramic 5.5MHZ
P501	3343-101-3107	JACK IP
P650	3344-107-7102	Module socket 5028-10A

POWER BLOCK

	3004-092-0103	PWB-POWER
T802	2869-145-0402	TRANS POWER
S802	3519-067-0100	Voltage selector S.W
C801	1569-201-0408	C-Metal polyester
		AC125V 0.1M-M
C802 C803 C804 C805	1419-106-5605	CD AC500V 4700P
D801 D802 D803 D804	2169-202-2206	Diode IS1887
R890	2189-605-0308	Posistor 7 ohm
F801	4709-084-7100	Fuse 250V 3A 20mm
F803	4709-083-1204	Fuse 250V 315mA 20mm

COMPONENT NOT MOUNTED ON PCB

CAPACITORS

C004 C005	1469-501-0101	CD AC125V 100-M
C065	1609-402-2208	EL 50V 2.2M
C066	1609-401-6700	EL 25V 47M
C076	1609-401-4302	EL 25V 10M
C463	1419-104-4109	CD 50V 0.0022M-K
C464	1419-901-4102	CD 2KV 680-K
C465	1519-004-0200	PF 1250V 0.001M-K

Schematic Location	Part No.	Description
RESISTORS		
R180	1018-227-1044	CF 1/4W 100K-J
R181	1018-227-7530	CF 1/4W 75K-J
R260	1018-227-1822	CF 1/4W 1.8K-J
R256	1202-104-0011	VR B-type 500Ω CONTRAST CONTROL
R257	1202-104-0109	VR B-type 5K BRIGHTNESS CONTROL
R351	1202-104-0118	VR B-type 200K V-HOLD
R555	1202-104-0066	VR B-type 10K COLOR CONTROL
R562	1018-227-3027	CF 1/4W 3K-J
R662	1018-327-4701	CF 1/2W 47-J
R810	1039-918-1505	R-Cement 25W 150-J
COIL & TRANSFORMER		
L462	2439-040-0103	Deflection Yoke DiD-1992BL
L901	2479-012-0203	Degaussing Coil 880MM 2P
T661	2789-532-0301	SOUND OUTPUT TRANS
SEMICONDUCTORS		
Q404	2149-301-4804	NPN Transistor 2SC1894 Horiz-Output
Q801	2149-401-1808	NPN Transistor 2SC1829 Power regulator
D403	2169-213-1108	Diode ITH61 Clamper
MISCELLANEOUS		
	6122-111-6103	Chassis Front Frame
	6122-111-6200	Chassis Main
E501	6509-300-4014	CRT Earth Lead
P001	3303-100-1238	Aerial Terminal Board
P801	3053-805-1331	Power Cord CP SPT-1
V901M	4099-007-0100	CONVERGENCE MAGNET
Z401	1295-101-0045	FOCUS PACK MHF005-03
E503 E504 E505	6814-101-402	SPACER D.Y
ACCESSORIES		
Y101		OWNER'S MANUAL
	2759-113-0107	ANT-ADAPTER
PICTURE TUBE & TUNER		
V901	2019-251-1108	Picture Tube 510UXB22
	4519-902-9106	TUNER-VARACTOR ENV7718F2

Schematic Location	Part No.	Description
PAL/SECAM CHROMA BOARD		
	3004-204-910	PWB-CHROMA
CAPACITOR		
C501	1409-101-1809	CD 50V 18-J
C502	1409-101-1207	CD 50V 10-D
C503 C517 C518	1419-104-4002	CD 50V 1000-K
C504 C506	1609-402-2101	EL 50V 1M
C505	1609-402-2004	EL 50V 0.47M
C507 C508 C509 C525 C510	1419-109-1400	CD 50V 0.01M-Z
C511	1609-402-2402	EL 50V 4.7M
C512 C513	1509-121-1804	PF 100V 2200-J
C514	1409-105-1801	CD 50V 22-J
C515	1409-105-1704	CD 50V 20-J
C516	1409-105-3005	CD 50V 68-J
C524	1609-401-4603	EL 16V 47M
C526	1609-401-4302	EL 25V 10M
CM01 CM02 CM03	1419-103-0303	CD 50V 150-K
CM04 CM34 CM42	1609-401-2101	EL 50V 1M
CM05 CM17 CM20 CM19 CM21 CM32 CM33	1609-401-4302	EL 25V 10M
CM06 CM07 CM08 CM09 CM14 CM15	1419-109-1400	CD 50V 0.01M-Z
CM12 CM22 CM23 CM40	1419-104-4002	CD 50V 1000-K
CM13	1629-201-5804	C-Tantalium 35V 0.22M-M
CM24 CM25	1409-101-8901	CD 50V 8 ± 0.25pF
CM26 CM27	1419-104-0400	CD 50V 150-K
CM28 CM29	1409-106-1202	CD 50V 12-J
CM30	1419-104-2701	CD 50V 680-K
CM31	1419-104-1706	CD 50V 820-K
CM35	1609-401-4700	CE 16V 100M
CM36 CM37 CM38	1509-121-1406	PF 100V 0.01M-J
CM44 CM45	1609-803-1202	EL 16V 10M(NP)
CM46	1609-402-2004	EL 50V 0.47M
CM39	1419-104-2002	CD 50V 1500-K
RESISTORS		
R501 R510 R511 R515	1018-227-8216	CF 1/4W 820-J
R502	1018-227-5646	CF 1/4W 560K-J
R504	1018-227-5636	CF 1/4W 56K-J
R505	1018-227-1035	CF 1/4W 10K-J
R506	1018-227-1521	CF 1/4W 1.5K-J
R507	1018-227-3929	CF 1/4W 3.9K-J
R508	1018-227-4711	CF 1/4W 470-J

Schematic Location	Part No.	Description
R509 R524 R526	1018-227-3910	CF 1/4W 390-J
R512 R530 R580 R583	1018-227-1044	CF 1/4W 100K-J
R513	1018-227-3336	CF 1/4W 33K-J
R514	1018-227-5114	CF 1/4W 510-J
R516	1018-227-8225	CF 1/4W 8.2K-J
R517	1018-227-8234	CF 1/4W 82K-J
R518 R519	1018-227-2739	CF 1/4W 27K-J
R520	1018-227-1220	CF 1/4W 1.2K-J
R521	1018-227-3318	CF 1/4W 330-J
R523, R525 R527	1018-227-2720	CF 1/4W 2.7K-J
R528	1018-227-1008	CF 1/4W 10-J
R581	1018-227-3336	CF 1/4W 33K-J
R551	1242-113-0073	VR 500ohm B-type
R552	1242-113-0037	VR 5Kohm B-type
RM01	1018-257-7515	CF 1/4W 750-J
RM02 RM36 RM37 RM38 RM16	1018-227-2720	CF 1/4W 2.7K-J
RM03	1018-227-4711	CF 1/4W 470-J
RM04	1018-257-1047	CF 1/4W 100K-J
RM07 RM28 RM29	1018-257-1524	CF 1/4W 1.5K-J
RM09	1018-227-3929	CF 1/4W 3.9K-J
RM10	1018-227-2252	CF 1/4W 2.2M-J
RM11	1018-227-2438	CF 1/4W 24K-J
RM12 RM13 RM14	1018-227-5628	CF 1/4W 5.6K-J
RM15 RM39 RM40 RM41	1018-227-3910	CF 1/4W 390-J
RM17 RM30	1018-227-6818	CF 1/4W 680-J
RM19	1049-311-1505	OMF 1/2W 150-J
RM20 RM21 RM48	1018-227-4313	CF 1/4W 430-J
RM24 RM25	1018-257-4325	CF 1/4W 4.3K-J
RM26 RM27	1018-257-1038	CF 1/4W 10K-J
RM31	1018-257-3311	CF 1/4W 330-J
RM33	1018-227-3929	CF 1/4W 3.9K-J
RM34	1018-227-1035	CF 1/4W 10K-J
RM35	1049-313-1307	OMF 1W 110-J
RM60 RM42 R585	1018-227-1026	CF 1/4W 1K-J
RM44	1018-227-8225	CF 1/4W 8.2K-J
RM45	1018-227-9123	CF 1/4W 9.1K-J
RM46	1018-227-3327	CF 1/4W 3.3K-J
RM47	1018-227-2429	CF 1/4W 2.4K-J
RM49	1018-257-1010	CF 1/4W 100-J
RM53	1242-113-0125	VR 10Kohm B-type
RM54	1018-257-1515	CF 1/4W 150-J

Schematic Location	Part No.	Description
R582	1049-311-8908	OMF 1/2W 91-J
R584	1018-227-1239	CF 1/4W 12K-J
COIL AND TRANSFORMER		
L501	2429-805-5009	Coil-Peaking 33μH
L502	2429-805-4101	Coil-Peaking 8.2μH
L503	2429-805-6042	Coil-Peaking 100μH
L504	2429-202-0603	Coil-Filter 15μH
L505	2429-805-9009	Coil-Peaking 1000μH
T501	2409-017-0106	Coil 123μH$\pm$15% Delay Phase Adjust
T502	2409-018-0109	Coil-Trap Sound 5.5MHz
LM01	2409-025-1106	Coil-Trap Sound 5.5MHz
LM02	2429-225-0109	Coil-Bell, Filter 7.8μH$\pm$25%
LM03	2769-110-0103	Coil-Ident . Det 4.3MHz$\pm$10%
LM04 LM05	2429-805-4101	Coil-Peaking 8.2μH
LM06 LM07	2769-109-0109	Coil-Chroma, Demod 285 μH$\pm$25%
LM08 LM09	2429-821-0101	Coil-Peaking 120μH
LM10	2429-803-1304	Coil-Peaking 10μH
SEMICONDUCTORS		
IC501	2119-101-4403	TA7193P Chroma
Q502	2139-103-3802	PNP Transistor KSA733-Y Delay line Amp
Q503 Q504 Q506	2139-302-7409	NPN Transistor KSC945-Y Q503:Blanking Q504:Inverter
ICM01	2119-101-7602	TA7621P SECAM-DEMOD
CM02	2119-101-7709	TA7622AP Colour Control
DM01 DM02	2169-103-0307	Diode 1S34
DM03 DM501 D502 D503	2169-301-9207	Diode ISS55
MISCELLANEOUS		
X501	4539-011-0108	Crystal 4.43MHz
X502	2469-010-1207	Delay Line -IH
XM01	2469-010-7100	Delay line -IH

CRT DRIVE BOARD

9102-114-1508	CRT Drive PWB

Schematic Location	Part No.	Description
CAPACITORS		
C531 C532 C533	1419-104-4002	CD50V 1000-K
C534 C535 C536	1409-101-2707	CD 50V 47-J
C902	1419-901-3204	CD 1KV 330-K
RESISTORS		
R252 R253	1242-110-0010	VR-SEMI 200ohm B-type R252:Green drive R253: Blue drive
R557 R558 R559	1242-110-0056	VR-Semi 10Kohm B-type R557: Red Bias R558: Green Bias R559: Blue Bias
R265	1018-227-1017	CF 1/4W 100-J
R533 R534 R535	1018-227-3327	CF 1/4 3.3K-J
R536 R537 R538	1018-227-2720	CF 1/4W 2.7K-J
R540 R541	1018-227-1512	CF 1/4W 150-J
R542	1018-227-2012	CF 1/4W 200-J
R591 R592 R593	1049-315-3905	OMF 2W 15K-J
R594	1018-227-3345	CF 1/4W 330K-J
R901 R902 R904	1028-328-4727	CC 1/2 4.7K-K
R905	1028-328-1041	CC 1/2 100K-K
R906	1028-328-3333	CC 1/2 33K-K
R907	1028-328-5643	CC 1/2 560K-K
R908	1028-328-4745	CC 1/2 470K-K
R920	1059-004-0205	R-Fusible 2W 1.8-K
R951	1245-101-0022	VR-SEMI 1Mohm B-type Screen Volume
R961	2189-102-1008	Varistor TNR-9G560K
COIL		
L591, L592 L593	2429-014-0806	Coil-CHOKE 1μH-K
SEMICONDUCTORS		
Q505 Q507 Q509	2149-302-9802 2139-301-2401	NPN Transistor 2SC2068 or KSC 1507-Y Q505: RED OUT Q507: BLUE OUT Q509: GREEN OUT
MISCELLANEOUS		
V901A	3354-103-3105	CRT SOCKET, 12P

Schematic Location	Part No.	Description
CONTROL BOARD		
	3004-092-410	PWB-CONTROL
SW001, SW002 SW003, SW004 SW005, SW006 SW007	3529-130-410	KEC10902
SW008	3519-100-010	KSA-2222
DO26	2309-115-510	KLR124E
D027	2309-115-410	KLG124E
D028	2309-115-510	KLY124E
R167, R168 R169	1018-227-152	CF 1/4W 1.5K-J
CN07	3054-213-810	12P. ASSY-CONNECTOR
VOLUME CONTROL BOARD		
	3004-092-110	PWB-VOLUME
SW009, SW010 SW011	3529-130-510	KHC 10901
CN08	3054-213-910	4P. ASSY-CONNECTOR
C065	1609-402-220	EL04W 50V 2.2M
CO66	1609-401-670	EL04W 25V 47M
C076	1609-401-430	EL04W 25V 10M
R180	1018-227-104	CF 1/4W 100K-J
R181	1018-227-753	CF 1/4W 75K-J
S801	3529-101-011	NA ESB 70224T 3A/250V
REMOCON BOARD		
	3003-025-610	PWB-REMOCON
RESISTORS		
R001, R002	1018-277-363	CF 1/4W 36K-J
R003, R095 R146	1018-277-183	CF 1/4W 18K-J
R004, R005 R006, R007 R008, R009 R010, R011 R012, R013 R014, R015 R016, R017 R018, R057 R063, R112 R113, R138 R143, R144 R145, R159 R019, R020 R021, R022 R023, R024 R025, R026 R027, R028	1018-277-473	CF 1/4W 47K-J

Schematic Location	Part No.	Description
R029, R030		
R031, R032	1018-277-103	CF 1/4W 10K-J
R047, R059		
R093, R125		
R126, R130		
R131, R132		
R140, R141		
R147		
R033, R034		
R035, R036		
R037, R038		
R039, R040		
R041, R042	1018-277-101	CF 1/4W 100-J
R043, R044		
R045, R046		
R053, R054		
R055, R139		
R203		
R048, R049		
R050, R051	1018-277-472	CF 1/4W 4.7K-J
R052, R121		
R127, R128		
R056, R069		
R070, R071		
R072, R073	1018-277-333	CF 1/4W 33K-J
R075, R079		
R097, R098		
R099, R137		
R060, R083	1018-277-393	CF 1/4W 39K-J
R084, R085		
R061, R062		
R065, R092	1018-277-104	CF 1/4W 100K-J
R094, R148		
R149, R150		
R066, R068	1018-276-432	CF 1/4W 4.3K-G
R064, R067	1018-277-122	CF 1/4W 1.2K-J
R153		
R074	1018-277-823	CF 1/4W 82K-J
R076, R100	1018-277-274	CF 1/4W 270K-J
R077	1018-277-134	CF 1/4W 130K-J
R078, R103		
R106, R107		
R108, R110	1018-277-223	CF 1/4W 22K-J
R111, R133		
R158		
R080, R081		
R122, R152	1018-277-822	CF 1/4W 8.2K-J
R162		
R082	1018-277-124	CF 1/4W 120K-J
R086, R087	1018-277-821	CF 1/4W 820-J
R088		
R200, R201	1018-277-682	CF 1/4W 6.8K-J
R161		
R202	1018-377-473	CF 1/2W 47K-J

Schematic Location	Part No.	Description
R096, R135	1018-277-102	CF 1/4W 1K-J
R136		
R101	1018-277-273	CF 1/4W 27K-J
R104, R105	1018-277-123	CF 1/4W 12K-J
R116, R117		
R109	1018-277-224	CF 1/4W 220K-J
R114, R115	1018-277-152	CF 1/4W 1.5K-J
R118	1018-277-391	CF 1/4W 390-J
R120, R157	1018-277-153	CF 1/4W 15K-J
R123	1018-277-432	CF 1/4W 4.3K-J
R124	1018-277-471	CF 1/4W 470-J
R129	1018-277-392	CF 1/4W 3.9K-J
R134	1018-277-221	CF 1/4W 220-J
R160, R185	1018-277-184	CF 1/4W 180K-J
R142	1018-277-561	CF 1/4W 560-J
R154	1018-277-824	CF 1/4W 820K-J
R161	1018-327-220	CF 1/2W 22-J
R058	1049-316-070	OMF 2W 2.2K-J
R102	1049-315-330	OMF 2W 10K-J
R119	1049-101-260	OMF 1W 68-J
VR001	1242-113-012	VR, V8K-4-1 B10K
CAPACITORS		
C001, C002		
C003, C004		
C500, C006		
C007, C008		
C009, C010		
C011, C012		
C013, C014		
C017, C018	1419-109-140	CD45F 50V
C019, C020		0.01M-Z
C021, C022		
C023, C024		
C025, C072		
C073, C030		
C080, C054		
C055, C071		
C015, C016	1409-106-250	CD45 SL 50V 330-J
C026, C084		
C081, C082	1419-106-130	CD45 B500V 1000-K
C083		
C031, C032	1419-104-400	CD45 B50W V 1000-K
C039, C040	1419-104-050	CD45 B50V 100-K
C047, C048	1409-106-380	CD45 RH50W V 180-J
C053	1419-194-220	CD45-B50V 220-K
C070	1409-101-440	CD45 SL50V 220-J

Schematic Location	Part No.	Description
C027	1609-403-211	EL04W 160V 10M
C029 C034 C037 C069 C033 C035	1609-402-200	EL04W 50V 0.47M
C043 C042 C051	1609-401-430	EL04W 25V 10M
C036 C045 C075	1609-402-210	EL04W 50V 1M
C038	1609-902-250	EL04W 50V 0.22M
C041	1609-401-710	EL04W 25V 470M
C044	1609-402-230	EL04W 50V 3.3M
C046	1609-401-670	EL04W 25V 47M
C049	1609-401-630	EL04W 35V 4.7M
C050, C085 C086	1609-401-460	EL04W 16V 47M
C052	1509-121-550	PF921M 100V 0.047M-K
SEMICONDUCTORS		
D050 D051		
D052 D053		
D001 D003		
D004 D007		
D008 D010	2169-202-260	KDS 1553, DIODE
D011 D012		
D013 D021		
D022 D023		
D024 D026		
D002	2169-201-090	IN4005
D015 D016	2169-201-070	IN4003
D017 D018		
D020		
D005 D006	2169-403-750	RF12EB, DIODE-ZENER
D014	2169-401-580	TAA 550B(ZENER)
D019	2169-404-440	WZ125(12.5V) (ZENER)
TR001 TR002		
TR003 TR004		
TR005 TR006		
TR007 TR008 TR009 TR010	2149-401-970	KSD 415R
TR011 TR012		
TR013 TR014		
TR045		
TR015	2149-301-430	KSC 1008-Y
TR016 TR017		
TR018 TR019		
TR020 TR024		
TR025 TR027		
TR028 TR933	2139-302-740	KSC 945-Y
TR034 TR035		
TR036 TR037		

Schematic Location	Part No.	Description
TR038, TR039		
TR040, TR041		
TR042		
TR021, TR022 TR026, TR030	2139-103-400	KSA 733-0
TR023, TR031 TR032, TR046	2149-401-820	KSD 261-0
TR029	2149-401-280	KSD 288-R
TR050	2149-101-850	2SA940
IC001	2190-401-140	TMS3452N 2L
IC002	2119-201-130	LM2901
IC003	2109-401-710	MC14073 BCP
IC004	2109-301-660	UPD 1987C
IC001A	2109-401-141	40 PIN(TMS3452 N2L), IC SOCKET
COILS		
CX001	4539-016-010	CSB 455E, RESONATOR CERAMIC
L001	2429-803-290	220 UH-K, COIL-PEAKING
RL001	4729-001-010	SC-1A-DC12V, RELAY
MISCELLANEOUS		
CN-01	3054-605-130	6P, ASSY-CONNECTOR
CN-05	3054-214-430	5P, ASSY-CONNECTOR

PRE-AMP BOARD

	3004-092-210	PWB-PRE, AMP
RESISTORS		
R160	1018-257-223	CF 1/4W 22K-J
R170	1018-257-221	CF 1/4W 220-J
R162	1018-257-222	CF 1/4W 2.2K-J
R163	1018-257-224	CF 1/4W 220K-J
R156, R164	1018-257-104	CF 1/4W 100K-J
R165	1018-256-254	CF 1/4W 240K-G
R166	1018-256-242	CF 1/4W 2.4K-G
R155	1018-257-563	CF 1/4W 56K-J
CAPACITORS		
C058, C059	1419-104-040	CC45 B50V 180-J
C060, C087	1609-401-430	EL04W 25V 10M
C061	1609-402-210	EL04W 50V 1M
C057	1419-109-1400	CD45F 50V 0.01M-Z
C056	1509-121-220	PF921M 100V 0.04M-J
SEMICONDUCTORS		
D023	2169-202-260	KDS 1553
D025	2199-002-060	PH302

Schematic Location	Part No.	Description
MISCELLANEOUS		
IC005	2109-301-630	UPC5502
IC006	2109-401-260	TL081CP
CN08	3054-214-210	3P. ASST-CONNECTOR
INDICATOR BOARD		
	3004-082-610	PWB/INDICATOR
NL001, NL002		
NL003, NL004		
NL005, NL006		
NL007, NL008	2209-007-010	RF6-GNB, NEON LAMP GROW

Schematic Location	Part No.	Description
NL009, NL010	2209-007-010	RF6-GNB, NEON
NL011, NL012		LAMP GROW
NL013, NL014		
NL015	2029-000-050	500 NEON-LAMP, GROW
CN01	3054-213-410	4P. ASSY-CONNECTOR
CN02	3054-213-610	7P. ASSY-CONNECTOR
CN03	3054-213-650	6P. ASSY-CONNECTOR
CN04	3054-213-710	8P. ASSY-CONNECTOR

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION" "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 1 OF THIS MANUAL.

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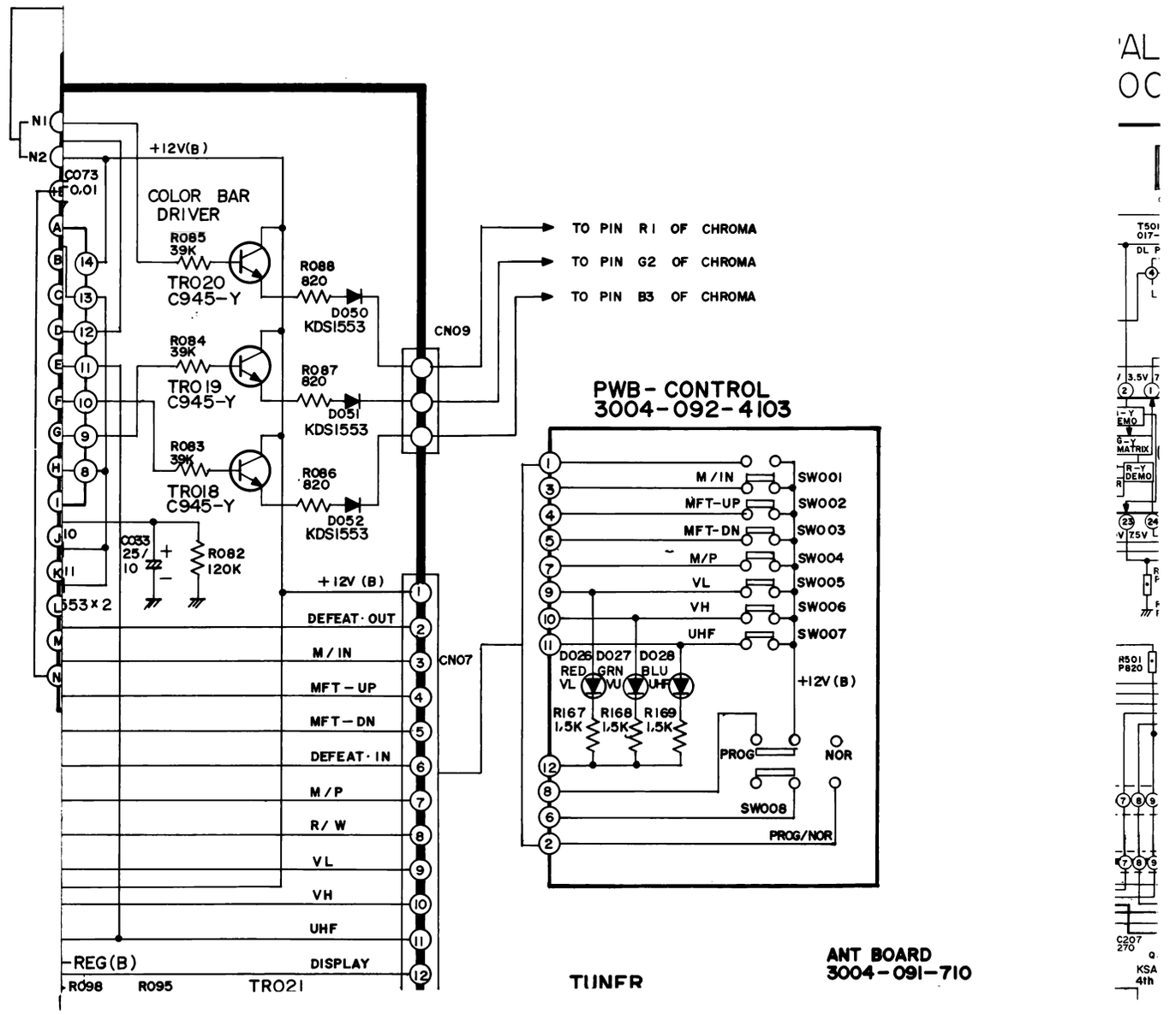
N1
N2
+12V(B)
C073 0.01
COLOR BAR DRIVER
R085 39K
TR020 C945-Y
R088 820
D050 KDS1553
R084 39K
TR019 C945-Y
R087 820
D051 KDS1553
R083 39K
TR018 C945-Y
R086 820
D052 KDS1553
C033 25/10
R082 120K
+12V (B)
DEFEAT·OUT
M/IN
MFT-UP
MFT-DN
DEFEAT·IN
M/P
R/W
VL
VH
UHF
DISPLAY
REG(B)
R098
R095
TR021
CN09
CN07
TO PIN R1 OF CHROMA
TO PIN G2 OF CHROMA
TO PIN B3 OF CHROMA
PWB-CONTROL
3004-092-4103
M/IN SW001
MFT-UP SW002
MFT-DN SW003
M/P SW004
VL SW005
VH SW006
UHF SW007
D026 RED VL
D027 GRN VU
D028 BLU UHF
R167 1.5K
R168 1.5K
R169 1.5K
+12V(B)
PROG
NOR
SW008
PROG/NOR
TUNER
ANT BOARD
3004-091-710

/SCM)

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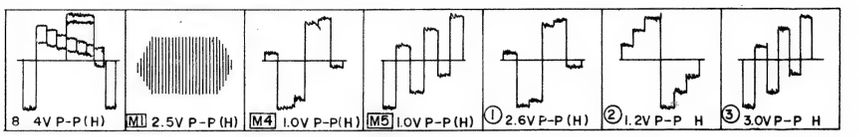
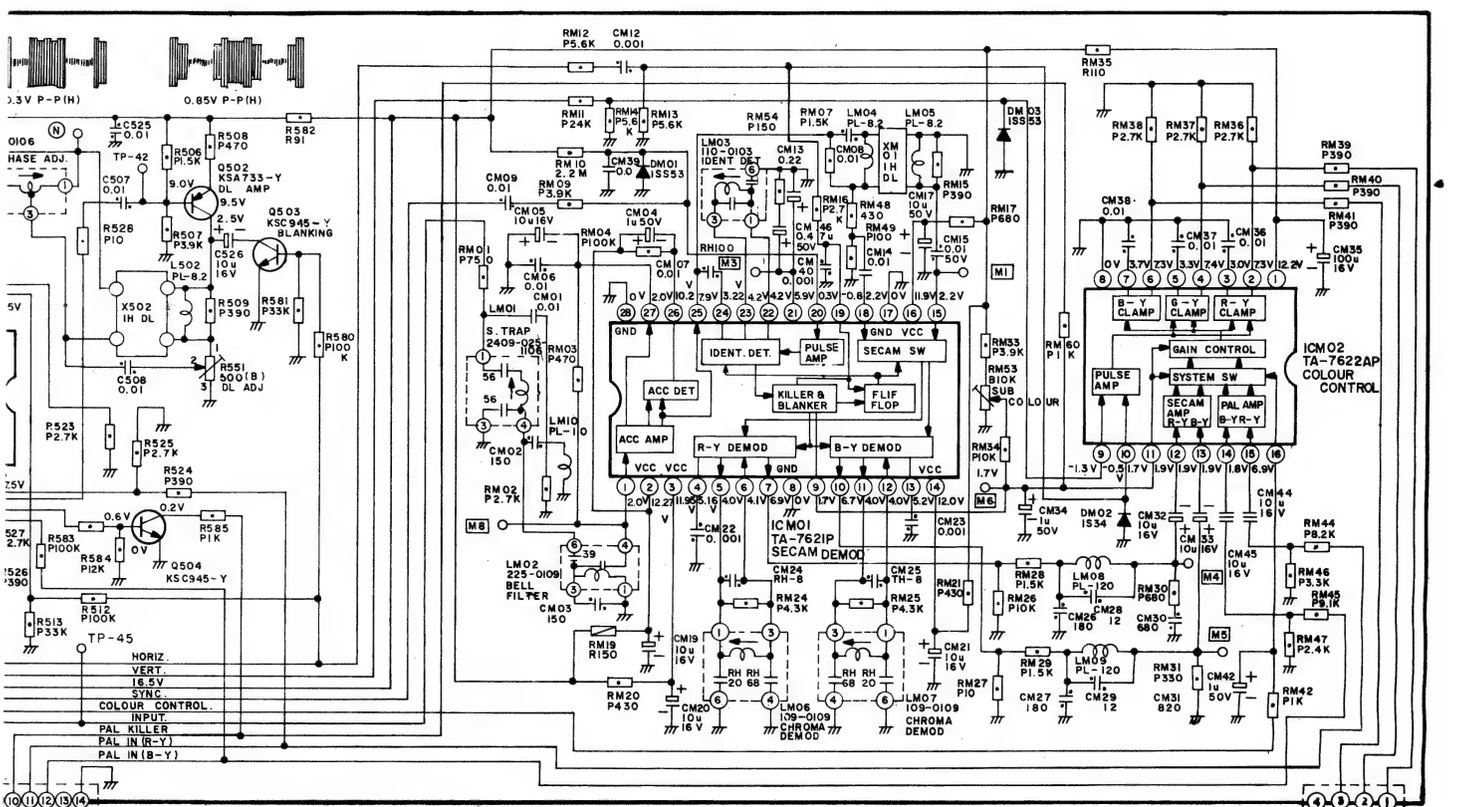
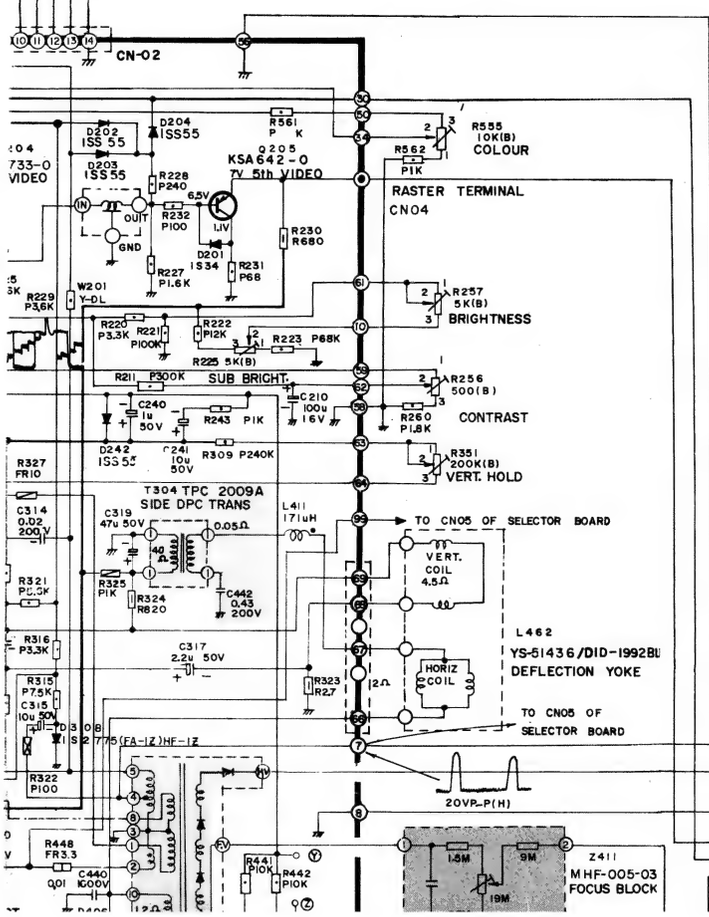
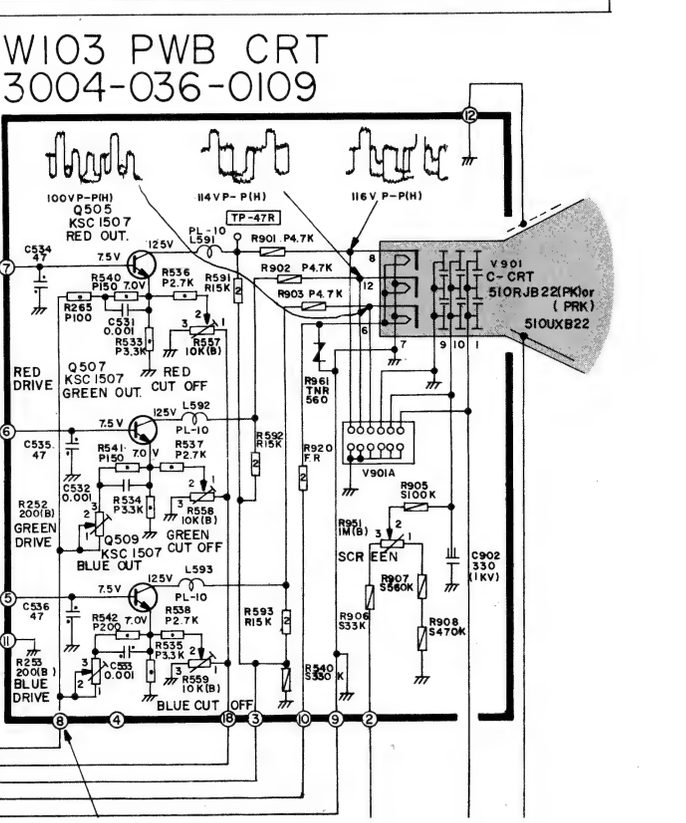

8 4V P-P(H)
M1 2.5V P-P(H)
M4 1.0V P-P(H)
M5 1.0V P-P(H)
① 2.6V P-P(H)
② 1.2V P-P H
③ 3.0VP-P H


IC M01
TA-7621P
SECAM DEMOD
IC M02
TA-7622AP
COLOUR CONTROL
IDENT. DET.
PULSE AMP
SECAM SW
ACC DET
KILLER & BLANKER
FLIP FLOP
ACC AMP
R-Y DEMOD
B-Y DEMOD
GAIN CONTROL
SYSTEM SW
PAL AMP
CN-03
TO CN09 OF SELECTOR BOARD
HORIZ.
VERT.
16.5V
SYNC.
COLOUR CONTROL. INPUT.
PAL KILLER
PAL IN (R-Y)
PAL IN (B-Y)


CN-02
RASTER TERMINAL CN04
R555 10K(B) COLOUR
R257 5K(B) BRIGHTNESS
R256 500(B) CONTRAST
R351 200K(B) VERT. HOLD
SUB BRIGHT.
T304 TPC 2009A SIDE DPC TRANS
TO CN05 OF SELECTOR BOARD
VERT. COIL 4.5Ω
HORIZ COIL 1.2Ω
L462
YS-51436/DID-19928L
DEFLECTION YOKE
TO CN05 OF SELECTOR BOARD
20VP-P(H)
Z411
MHF-005-03
FOCUS BLOCK


W103 PWB CRT
3004-036-0109
100VP-P(H)
114VP-P(H)
116VP-P(H)
Q505 KSC1507 RED OUT.
Q507 KSC1507 GREEN OUT.
Q509 KSC1507 BLUE OUT
RED DRIVE
GREEN DRIVE
BLUE DRIVE
RED CUT OFF
GREEN CUT OFF
BLUE CUT OFF
SCREEN
V901 C-CRT 510RJB22(PK)or(PRK) 510UXB22

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PRINTED IN KOREA
MAY. 1982